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MILLER CAVE (23PU2), FORT LEONARD WOOD, PULASKI COUNTY, MISSOURI: REPORT OF ARCHAEOLOGICAL TESTING AND ASSESSMENT OF DAMAGE

Charles W. Markman

1993

Prepared by:
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St. Louis, Missouri

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Kansas City District

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Charles W. Markman
Author and Principal Investigator

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The results reported herein show that despite extensive disturbance by previous digging and vandalism, significant, intact deposits remain in Miller Cave (23PU2) which render the site National Register eligible. In the darkened back of the cave, intact Late Woodland deposits were found including two complete dog skeletons, one with an associated biface. Also, an Early Archaic deposit was encountered in the main chamber, which included Rice Lanceolate, Rice Lobed, and Hidden Valley Stemmed diagnostic points. Associated wood charcoal yielded a radiocarbon assay of 8500 ± 180 BP. Faunal and ethnobotanical data were also recovered. It is recommended that the cave and the nearby associated rock art (23PU255) be placed on the National Register of Historic Places and that these resources be protected from further vandalism by additional surveillance. If additional surveillance is not feasible, Phase III data recovery is recommended.

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ABSTRACT / EXECUTIVE SUMMARY

Excavations were conducted in Miller Cave (23PU2) on the Fort Leonard Wood military base in south-central Missouri to assess the extent of damage to deposits in the cave and to ascertain if intact deposits remain that render the site National Register eligible or of "archaeological interest" as defined by the Archaeological Resources Protection Act (ARPA). This investigation provides a baseline for determining the extent of any further damage that might occur and will be available for use in ARPA prosecutions.

The results reported herein show that despite extensive disturbance by previous digging and vandalism, significant, intact deposits remain which render the site National Register eligible. In the darkened back of the cave, intact Late Woodland deposits were found including two complete dog skeletons, one with an associated biface. Also, an Early Archaic deposit was encountered in the main chamber, which included Rice Lanceolate, Rice Lobed, and Hidden Valley Stemmed diagnostic points. Associated wood charcoal yielded a radiocarbon assay of 8500 $\pm$ 180 BP. Faunal and ethnobotanical data were also recovered.

Hence, the cave still contains intact deposits that can contribute substantially to our understanding of the Early Archaic and the Late Woodland periods, despite the evidence of collector activity. The intact Early Archaic deposits were encountered beneath the backdirt from a trench dug by Gerard Fowke just after World War I. Fowke's trenches and backdirt were identified using photographs taken in 1939 and Fowke's published report in the Smithsonian Institution's ***Bureau of American Ethnology Bulletin*** (Fowke 1922).

It is recommended that the cave and the associated rock art be placed on the National Register of Historic Places and that it be protected from further vandalism by additional surveillance. If additional surveillance is not feasible, Phase III data recovery is recommended.

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Frontispiece. View of the Big Piney River looking southwest from the mouth of Miller Cave.

CHAPTER 1

INTRODUCTION

PROJECT CULTURAL RESOURCE MANAGEMENT OBJECTIVES

Miller Cave[1] (23PU2) first appeared in the archaeological literature in 1922 (Fowke 1922). The site is located in Pulaski County, Missouri, within the Big Piney USGS 7.5 minute quadrangle (Township 35N, Range 10W, Section 31, SE¼, SE¼, NE¼, NE¼) and within the boundaries of the Fort Leonard Wood Military Reservation. Ft. Leonard Wood encompasses about 15 percent of Pulaski County as well as small portions of Laclede and Texas Counties (figures 1-1 and 1-2).

Miller Cave is well known and frequently visited by local enthusiasts of archaeology and others. The scattered picnicking debris one encounters throughout the cave is evidence of a constant traffic of visitors. Numerous pits in the cave floor create an effect reminiscent of a lunar landscape and show the results of casual digging (figure 1-3). The cave encompasses between 600 and 700 square meters of floor space with underlying archaeological deposits.

The investigation reported herein was funded by Fort Leonard Wood through a contract administered Kansas City District, Corps of Engineers in their effort to manage and protect cultural resources on the base. Excavations were conducted in Miller Cave during March of 1992 to ascertain if intact deposits might remain that would render the site eligible for listing on the National Register of Historic Places (NR) or, at least, of "archaeological interest," as defined by the Archeological

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1 The site has alternately been referred to in the literature as "Miller Cave" and "Miller's Cave." The Fowke report (1922) uses "Miller's Cave." In his overview of Missouri archaeology, Carl Chapman also refers to the site as "Miller's Cave" (1975:172). Bruce McMillan reports it as "Miller Cave" (1965) and it is listed as "Miller Cave" in the statewide site files maintained by the Missouri Archaeological Society.

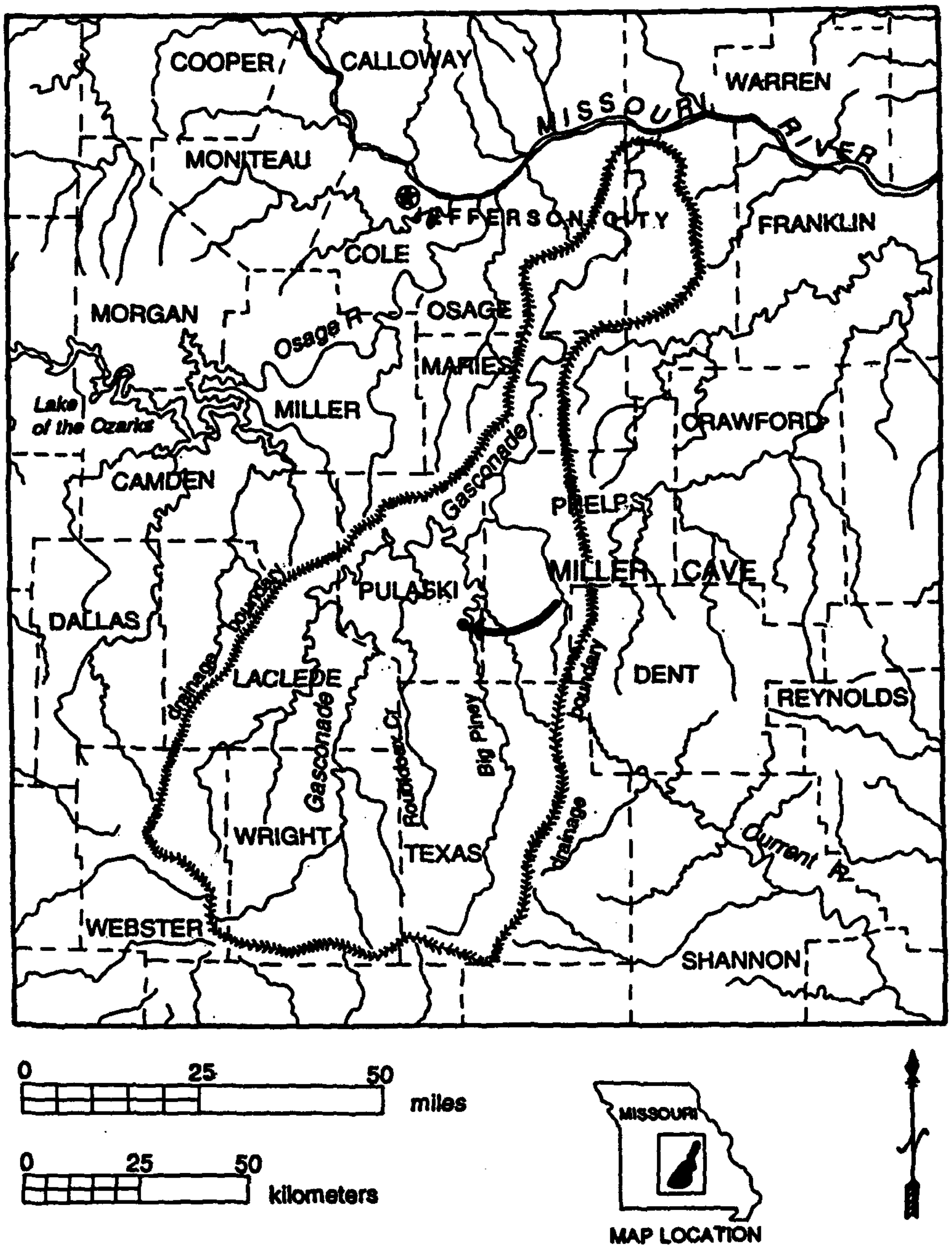

Figure 1-1. Miller Cave location within the Gasconade drainage.

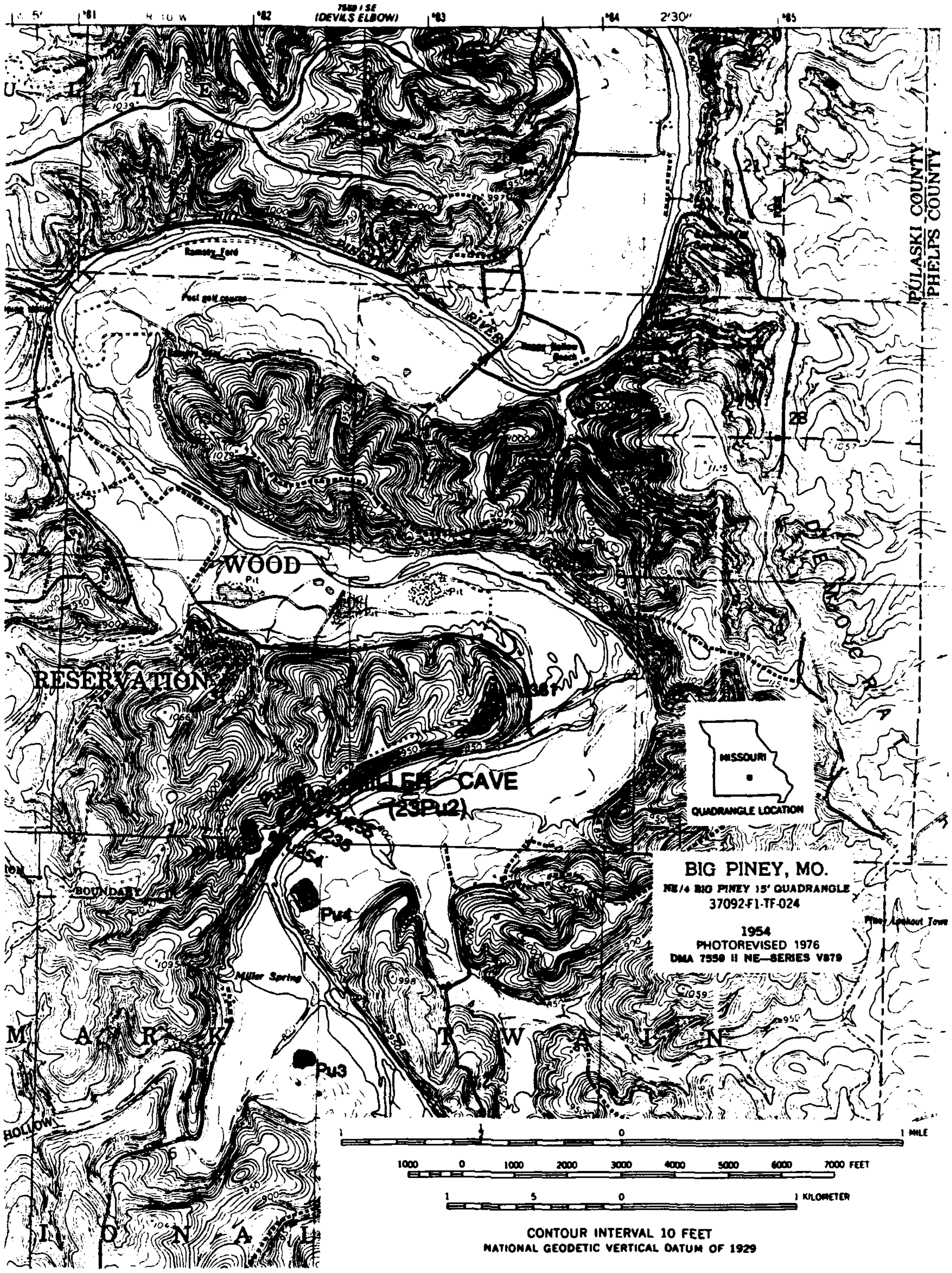

Figure 1-2. Miller Cave and sites in the near vicinity including the associated petroglyphs (PU255), a rock cairn (PU254), Sadie's Cave (PU235), bottomland village sites (PU4 and PU3), and upland artifact scatters (PU361, 362, 288).

Figure 1-3. View of the main chamber of Miller Cave showing remnants of the large trenches of Gerard Fowke and the results of pitting of surfaces by subsequent collectors and other cave visitors.

Resources Protection Act (ARPA). The materials illustrated in Gerard Fowke's report indicate that, at least at one time, the cave contained very rich archaeological deposits spanning thousands of years of Ozark prehistory from the Early Archaic through the Late Woodland periods. It remained to be seen, however, if any of the deposits remained intact and if data could be acquired that could address questions left unanswered by Fowke. His techniques, while quite adequate for that time, lacked the refinement necessary to address central issues of modern archaeology.

The present study demonstrates that intact deposits do remain which render the site both NR eligible and eligible for protection under ARPA.

NATURAL SETTING AND ENVIRONMENTAL CONTEXT

The Cave

Perched 70 meters above the Big Piney River and looking out from the main chamber of Miller Cave, one has a panoramic view of the Big Piney, the gently rising meadows across the river, and the low wooded hills beyond (frontispiece). From across the river, the gaping mouth of the cave can be seen in the dolomite rock face that rises vertically above a forested slope. The slope descends precipitously to the river's edge and is so steep that it is nearly impossible to walk along it without clutching the trunks of the oaks and hickories that cling to the hillside. To enter the cave directly from the river, it would be necessary to scale a 3 to 4 meter wall after reaching the top of the forested slope. A more accessible entrance can be found a short distance to the southwest and higher up along the same ridge. This entrance does not face the river but is perpendicular to it and hidden from view. It leads into a corridor-like antechamber or "outer cave" (figure 1-4). The corridor descends toward the main chamber (figure 1-4 and 1-5). There is a constricted opening between this antechamber and main chamber, passable only by one person at a time. Entrance requires climbing over the large rock threshold. The entrance, or doorway, is well lit by a sizable opening in the antechamber facing towards the river. Once through the doorway, the main chamber receives plentiful daylight from the mouth of the cave, which measures over 15 meters across and between 3 and 5 meters high. The ceiling of the main chamber is generally about 2.5 meters high but particularly variable

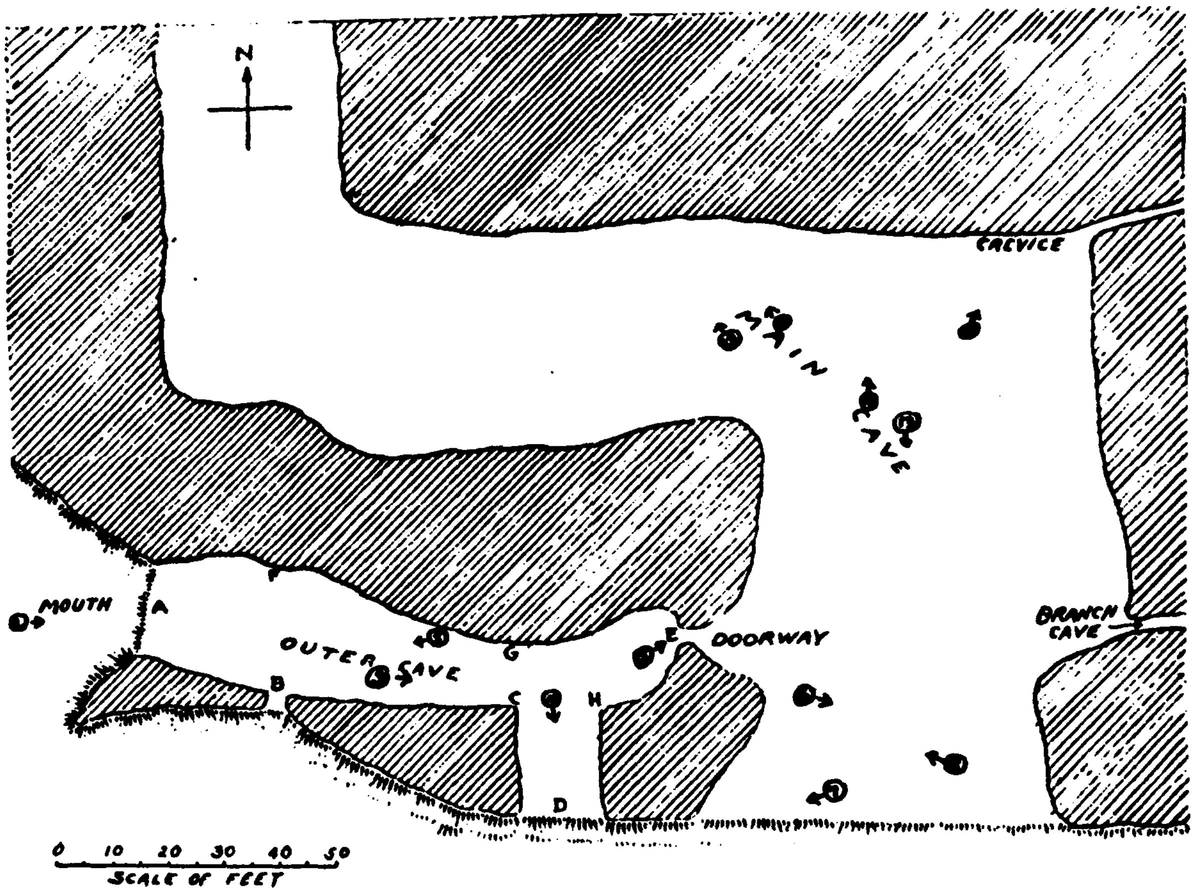

Figure 1-4. Map of Miller Cave published by Gerard Fowke (1922) and annotated by Leonard Blake in 1939 showing the position and direction of photographs in Blake's album. Several of the photographic positions are incorrect. Nevertheless, it is not difficult to reconstruct the positions from which Blake took his pictures, even with erosion of the floor and other changes that have occurred with time. See, for instance, figures 1-6 and 1-7.

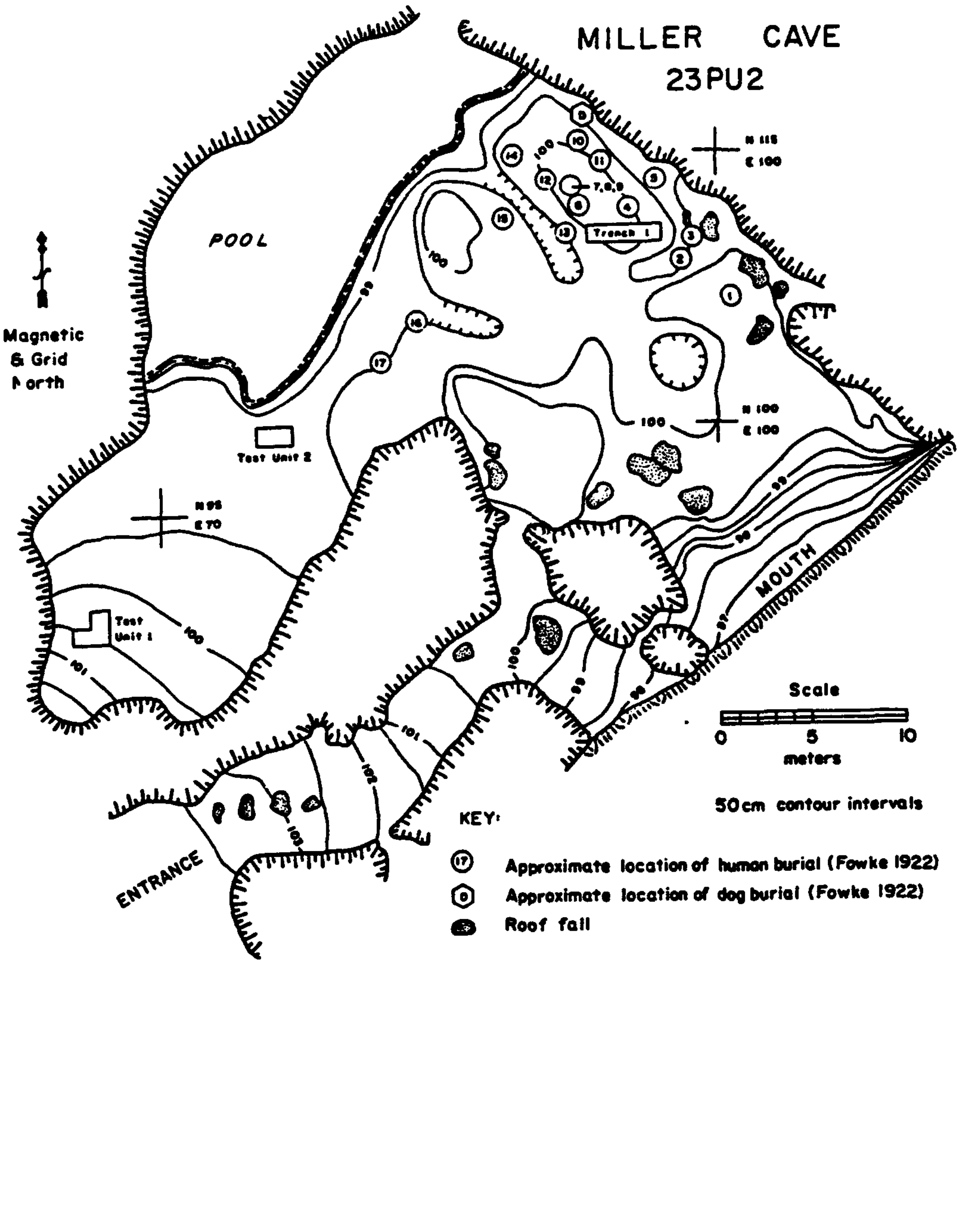

Figure 1-5. Transit map of Miller Cave showing floor contours and 1992 excavation units. Compare with figure 1-4.

because of the unevenness of the floor. The floor at the mouth of the cave slopes rapidly downward toward the outside. Evidently, much erosion has occurred over the half century preceding the current investigations (see figures 1-6 and 1-7). The highest concentration of pitting in the cave floor occurs in the well-lit areas of the main chamber. In addition to the many small pits and depressions, two large trenches are also evident. At least one of these can be identified as a remnant of Gerard Fowke's expedition.

A pool of standing water can be found along the back wall of the cave opposite the mouth. The pool drains through a crevice in the north corner (Figure 1-5) (the northeast corner as shown on Fowke's map reproduced as Figure 1-4). Although the water level fluctuates, it is a permanent pool that was also noted by Fowke. In addition to the crevice passage in the north corner of the cave, there is another narrow side passage with an opening about 12 meters back from the mouth of the cave.

The cavern is roughly L-shaped, turning a corner at the pool. As one proceeds farther into the darkened portion of the cave, the floor slopes upward. An area of stalactite and stalagmite formations can be found along the southwest wall after turning the corner into the darkened back of the cave.

The floor of the main chamber consists of dusty aeolian deposits, interpreted as ash by Smithsonian archaeologist, Gerard Fowke:

> This [deposit] was composed entirely of ashes from small fires for cooking, heating and lighting purposes, increased to a very limited extent by kitchen waste, and by discarded or mislaid wrought objects. It represented the combustion of many hundreds, perhaps thousands, of cords of wood, all of which had to be carried in from the hilltop or slopes and passed through the constricted doorway. This labor would be a sufficient guarantee of economical use; we may be sure then that no fuel was wasted. If proof were needed of such a self-evident proposition, it would be found in the almost complete absence of charcoal; here and there, but seldom, a small mass of it showed that a burning chunk, covered up, had smoldered until the inflammable portion was consumed [1922:65-66].

Desiccated deposits may have existed in the cave at the time it was excavated by Fowke, as he reports recovering fragments of coarse cloth adhering to the pelvis of

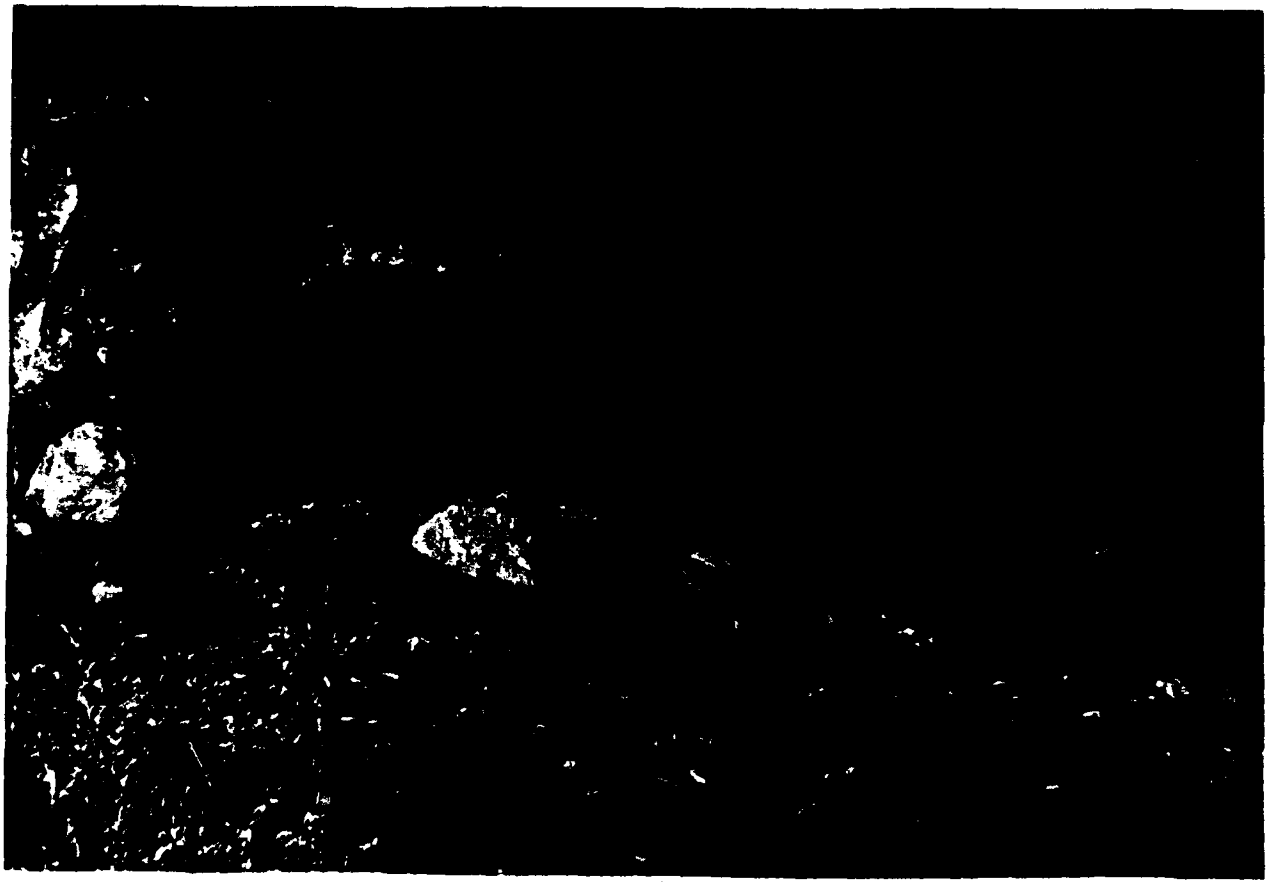

Figure 1-6. Photograph taken by Leonard Blake in 1939 from the mouth of the cave looking into the main chamber toward the "doorway," Blake's position number 8 (see figure 1-4). The trench quite likely resulted from the excavations of Fowke twenty years earlier.

Figure 1-7. The same scene as figure 1-6, taken in March of 1992. A comparison of the two photographs provides documentation of the amount of erosion that has occurred at the sloping mouth of the cave.

a burial (1922:70). In various caves in the Ozarks, it has been observed that digging and the creation of backdirt piles have changed air circulation patterns causing a change in dry conditions that would preserve perishable materials.

The cave provides an ideal shelter for all seasons. Because it faces southwest, it affords protection from the harshest winter winds that prevail from the west and northwest and maximum exposure to sunlight. It also provides a cool and comfortable escape from the heat of the central Missouri summer.

The Region

Miller Cave is located within the Ozarks, an upland region that extends north-south from the Missouri River into northern Arkansas and east-west from eastern Missouri River into eastern Oklahoma. This reach of the Big Piney River is near a drainage divide. Just to the east, the Meramec flows in a northeast direction, emptying into the Mississippi River in the St. Louis area, just below the Missouri-Mississippi confluence. The nearby Current River flows southeastward to join waters that eventually flow into the Mississippi River in southeast Arkansas. The Big Piney River itself flows northward to join the Gasconade River on its way to the Missouri River.

The Gasconade Study Unit, as defined by the statewide Master Plan for archaeological resource protection (Weston and Weichman 1987), provides a regional context for this study. The unit encompasses the Gasconade drainage basin including the Big Piney watershed (figure 1-1).

Geology and Physiography

The Missouri River marks the southernmost extent of the Pleistocene glaciations and a boundary between the Ozarks and the dissected till plains to the north. The Ozark upland is characterized by plateaus and low hills. Pulaski County is found within a subdivision of the Ozarks referred to as the Salem or Central Plateau (Rafferty 1980). The Salem Plateau and the Springfield Plateau are the only districts of the Ozarks where there are large expanses that have not been dissected. However, the land along the Big Piney River and Roubidoux Creek as well, is quite rugged and

displays a relief that contrasts markedly with the gently rolling uplands typical of the Central Plateau. These streams are deeply entrenched in the plateau, yet they follow meandering courses. The stream courses must have been established at a time when they drained a low-lying plain that was gradually uplifted over long periods of time (Rafferty 1980:8).

The geologically complex Ozark region was formed by forces of uplift centered on its eastern side. The St. Francis mountains of southeast Missouri are an igneous outcrop that provides evidence of the original forces that raised and tilted the overlying sedimentary rocks. In Pulaski County, the Precambrian igneous bedrock lies approximately 400 meters below the surface. Above, from oldest to youngest, are Gasconade Dolomite, Roubidoux dolomite and sandstone formation, Jefferson City Dolomite, and Pennsylvanian clay or sandstone (Wolf 1989). In limited areas in the western part of the county, Mississippian cherty limestone outcrops occur on some of the higher hilltops. Miller Cave occurs in the Gasconade formation, a 75 to 100 meters thick layer of gray to light brown dolomite. Most of the high bluff outcroppings along the major stream valleys are exposures of Gasconade dolomite.

The erosion of soluble carbonate components of the dolomite bedrock has given this region its many Karst features including solution channels, springs, sinkholes, and caves along the bluff exposures. It has been noted that Pulaski County is one of the nation's leading counties in numbers of caves reported (Weston and Weichman 1987:B-9-1). The cuesta formation on the west bank of the Big Piney River where Miller Cave is found is very typical of the Ozarks, with a steep front slope and gentle back slope marking layers of resistant rock underlain by rock weakened through solution of carbonates by groundwater.

Archaeological data indicate that local cherts from the Gasconade, Roubidoux, and Jefferson City formations were the raw material of preference for chipped stone tool manufacture by the prehistoric inhabitants of the region (Ray 1985). The cherts from the three formations are difficult to distinguish on visual inspection. All occur in oolithic and banded forms and range in color from brown to gray to white. Positive distinctions can be made on the basis of banding and fossil inclusions. Other less common cherts that occur at local sites are from the Burlington, Elsey, and Pierson

formations (Reeder 1988:25). A sedimentary quartzite (orthoquartzite) occurs in the Roubidoux formation and was commonly used in some areas of the Ozarks.

Soils

The upland soils of the Miller Cave vicinity are typical of the Clarksville-Gepp association (Wolf 1989) found over large portions of the Ozark uplands. These soils are formed in dolomite residuum and cherty sediments. The resistant cherts (silicates) have remained as the carbonates have been eroded away, leaving cherty, stony soils. The talus that descends to the river is classified as Gepp-Rock outcrop complex, which occurs on 30 to 60 percent slopes. The unit is characterized by an intermingling of Gepp soils and Rock outcrops with about 30 percent of the surface being rock outcrop (Ibid.: 35). The Gepp soil is dark, grayish-brown, cherty-silt loam about 10 cm (4 in) thick. The subsoil generally extends to a depth of about 1.5 meters (60 in) and grades from a strong, brown, mottled, cherty, silty clay to a red, mottled clay to a yellowish-red, mottled, very cherty clay. The talus rock outcrop consists of gravel, stones, and boulders intermixed with soil particles that have eroded from above (Ibid.: 35).

Soils of the ridgecrest above are predominantly Doniphan, very cherty, silt loam, characteristic of 3 to 9 percent slopes. The thin surface layer, about 5 cm (2 in) thick is dark, grayish-brown, very cherty, silt loam. Subsoil of light yellowish-brown, very cherty, silt loam can be found to a depth of about 28 cm (11 in) below surface. Under this is a 10 cm (4 in) thick layer of strong, brown, silty clay loam mixed with yellowish-brown, silt loam. A yellowish-red and dark red, mottled clay then extends to a depth of 1.5 meters (60 in).

Soils of the back slope are predominantly Clarksville-Gepp, very cherty, silt loams with slopes being 14 to 35 percent. The Gepp soil is generally on the lower part of slopes and benches. Clarksville soils are on steeper areas of the slope. Clarksville soils, generally covered by leaf and pine needle litter, have a surface layer of brown, very cherty, silt loam that is about 8 cm (3 in) thick. A 25 cm (10 in) thick subsurface layer is light yellowish-brown, very cherty, silt loam. Then, a subsoil extends to a depth of 1.5 meters (60 in) or more, grading from a strong brown, very

cherty, silt loam to a strong brown and yellowish-red, mottled, extremely cherty, silty loam to a cherty, silty clay.

The meadows across the Big Piney River from Miller Cave consist of a broad expanse -- about 400 meters wide -- of Nolan silt loam, an alluvial soil typical of floodplains on the major streams and their larger tributaries. Continuing downstream, the adjacent floodplain is classified as Kickapoo, fine, sandy loam. Both the Nolan and Kickapoo soils are characterized as friable and easily tilled (Ibid.: 20-21).

Climate

Pulaski County has a typical midcontinental climate characterized by wide contrast in winter and summer temperatures and frequently by rapid weather changes from day to day. Weather can also vary drastically from year to year.

Average winter temperature is 2 degrees Centigrade (C) [35 degrees Fahrenheit (F)]. In summer, the average temperature is 24 degrees C (75 degrees F). The record winter low temperature is -30 degrees C (-5 degrees F), recorded in 1951. A record high of 46 degrees C (115 degrees F) was recorded on July 14, 1952.

Precipitation averages about 100 cm (39 in) per year, and rainfall is fairly evenly distributed throughout the year, except for a small increase in the spring. Also, periods of 2 to 3 weeks without rain are characteristic of the mid-Missouri summer and can make the woods extremely fire prone.

A year without snowfall would be very unusual. However, the ground is rarely blanketed for more than a few days before the snow melts.

Vegetation and Wildlife Habitat

Based on aboriginal vegetation, the Ozarks have been classified as a prairie-forest transitional zone, lying between the forests of the Southeast and the tall grass prairies to the northwest (Cf. Kindsher 1987:6). Ft. Leonard Wood and surrounding area are, for the most part, covered by forest. Yet, the transitional nature of this forest is revealed by limited patches, locally known as glades, which support grassy, prairie-

like growth as well as by expanses of savanna on the gently rolling uplands, away from the major stream valleys. On the savanna, or oak-hickory barrens, trees are widely spaced, allowing a grass ground cover to develop, rather than the usual litter of leaves (Grinstead 1991). Prairie-like ground cover is also characteristic of new succession after clearing or burning. Grinstead notes that tall, native, warm season, prairie grasses are spreading on areas of the military reservation that were agricultural fields prior to the Army acquisition in 1940 (1991).

To outline the plant and animal resources that might have been available to the prehistoric inhabitants of Miller Cave, it is useful to discuss the local environment in terms of resources zones, each corresponding to "physiographic land management zones" (PLMZ) defined by Grinstead (1991). Vegetation and wildlife habitat are key factors in distinguishing these zones. Although Grinstead confined his observations to the military reservation, these environmental zones provide a good representation of current wildlife habitats. Also, the information is useful as baseline for reconstructing habitats that might have been accessible during prehistoric times within the near vicinity of the cave as well as within a 1 or 2 day foray on foot from a base camp or village on the Big Piney River.

Caution is necessary in using current or even nineteenth century environmental data for assessing available resources in the past. Euro-American settlement quickly modified the environmental mosaic across the American continent (Cf. F.King 1976; Parmalee 1968:112). Although the local area was relatively lightly inhabited in the nineteenth century, hunting with firearms and forest clearing must have had a substantial impact on the native ecosystem changing the frequency and distribution of local species (Geier 1975:25). Clearing for farming must have created habitat for species that prefer open habitat at the expense of forest habitat and forest species. Some species have been extirpated from this region. For instance, predators such as mountain lion (*Felis concolor*) and bobcat (*Lynx rufus*) are no longer evident, nor are elk (*Cervus canadiensis*), although these species are known from archaeological deposits (Parmalee 1965).

Also, an awareness of taphonomic and cultural factors is warranted if archaeological data are to be used to assess available resources in the past. It is reasonable to assume that not all archaeological bone deposits are necessarily the

result of human activity but might be the result of animal carnivores. For instance, a recently abandoned fox lair was noted in the back of Miller Cave which included the gnawed and discarded bones of small mammals.

Archaeological faunal and floral assemblages also reflect culturally prescribed preferences and strategies for exploiting seasonally available resources (Cf. Flannery 1968; Struever 1968). These cultural patterns have been of central interest to archaeologist and must be viewed against a background of environmentally prescribed choices.

The following discussion of habitat composition for each PLMZ is based on Grinstead (1991).

Riparian Bluffs and Waterway Corridors

Miller Cave is situated within this zone which encompasses the major streams and the associated terrain including floodplain, terraces, rock cliffs, steep, stony bluffs, short tributaries, and finger ridges. Of the four natural zones delineated, the riparian zone is the most biologically diverse and productive in terms of human subsistence. Not surprisingly, archaeological data show that this was a prime area of settlement during prehistoric and historic times. Prehistoric sites are clustered in the riverine zone (Markman and Baumann 1993; Baumann and Markman 1993; Moffat et al. 1989:200-205). Archaeological materials on the upland hills and savanna occur mostly as isolated finds (Markman and Baumann 1993; Baumann and Markman 1993; Moffat et al. 1989:200-205).

Willows and sycamores, stunted by frequent flooding, grow on the sand and gravel bars and river banks. The river banks are also vegetated with elm (*Ulmus sp.*), soft maple (*Acer saccharinum* L.), ash (*Acer* sp.), and a large variety of other hardwood species. On the Army base, river terraces are frequently covered with a midsuccessional stage of young, mixed hardwood, forest growth consisting of bluegrass (nonnative), raspberry (*Rubus occidentalis*), brambles, poison ivy (*Rhus radicans*), persimmon (*Diospyros virginiana*), elm, black walnut (*Jugalns nigra*), and green ash (*Fraxinus pennsylvanica* var. *subintegerrima*). Off base, floodplains and terraces are almost all cleared for crops and grazing. Presumably, climax hardwood

forest grew on the floodplains prior to historic settlement. However, a topic that merits further exploration is the impact of Native American burning and land clearing practices prior to Euro-American contact. Burning was used for forest clearing, and also, early historic accounts describe extensive burning used by some groups as hunting strategy (Cf. Anderson 1901:81; Chapman 1946).

Steep, south facing slopes, such as those below Miller Cave, are covered with a growth of mixed oak and red cedar (*Juniperus viginiana* L.). Northerly aspects are vegetated with rich oak forests. Rocky bluffs are generally sparsely vegetated with scattered red cedar and a grassy, prairie-like growth in flat or gently slope glades.

While there is virtually no wetland habitat in Pulaski and surrounding counties, the river bottoms attract limited numbers of migratory water fowl including wood ducks (*Aix sponsa*), blue-winged teal (*Anas carolinensis*), and geese (Wolf 1989:45). Waters of the Big Piney River and Roubidoux Creek contain largemouth (*Microterus salmoides*) and smallmouth bass (*M. dolomieui*), channel catfish (*Ictalurus furcatus*), bullheads (*Ictalurus* sp.), crappie (*Pomoxis* sp.), carpsuckers (*Capiodes carpio)*, walleye (*Stizostedion* sp.), and sunfish (*Lepomis* spp.). Semi-aquatic fur-bearers found in this zone include beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), and mink (*Mustela vison*). Raccoon (*Procyon lotor*), fox (*Vulpes vulpes)*, coyote (*Canis latrans*), squirrel (*Sciurus* sp.), and striped skunk (*Mephitis mephitis*) also live here. Deer (*Odocoileus virginianus*), rabbit (*Sylvilagus floridanus*), and wild turkey (*Meleagris gallopavo*) are virtually ubiquitous, occurring in the riparian zone and other zones, as well. Wild turkey flocks were observed from the cave entrance during excavations. Also, buzzards (*Cathartes aura*) were frequently seen outside the cave mouth riding the updrafts. Eagles (*Haliaeetus leucocephalus*), once nearly extinct, are now observed annually as they return to fish the Big Piney River. Great blue heron (*Ardea herodias)* are present. A rookery exists on Roubidoux Creek.

Forested River Hills

This zone borders the riparian zone and consists of more gently rolling, upland hills and flats. It encompasses steep, forested, hills and ridgetops and narrow, forested bottomlands of tributary streams. The forested river hills are characterized by an oak-hickory association. Black oak and white oak predominate on the slopes with post oak

and blackjack oak becoming common on the dry, south facing slopes. Serviceberry and dogwood are common understory species. Black walnut and black gum (*Nyssa sylvatica*) are common components of the bottomland hardwood mix.

The range of wildlife habitat is less varied than in the riparian zone. Freshwater mussels and fish are virtually missing, as most streams are seasonal or, at least, very reduced in summer months. The many springs which feed these streams generally go dry in summer, limiting the capacity for supporting wildlife or human population.

Upland Forested Hills

The Upland Forested Hills encompasses a transition zone, well away from the Big Piney and Roubidoux between the river hills and upland savanna. There is less relief than on the steeply dissected river hills. Ridgetops are flatter and much broader. Springs and sinkholes are common. However, few springs and streams have a perennial flow.

The vegetation is similar to the river hills with black and white oaks on most slopes and with blackjack and post oak on the dryer, south slopes. However, hickory becomes more common. Abandoned farm fields are commonly covered with a new succession of broom sedge (*Andropogon virginicus*), blackberry (*Rubus* spp.), cedar, and sassafras (*Sassafras albidum*). Some have been planted with shortleaf pine (*Pinus echinata*).

Today, hunting is very popular in this zone, and it is considered a highly productive wildlife habitat. The productivity may have been enhanced by the open habitat created by clearing, juxtaposed with old growth conditions that have developed on light weapons ranges which are not suitable for timber harvests.

Upland Rolling Hills and Savanna

This area of open forest and grassland roughly corresponds to an area described in the nineteenth century as "post oak flats" (S.Smith 1993:Figure 2.2). Tree growth is significantly less high than on the forested hills. In this part, growth is restricted by a

fragipan, a very dense soil layer that is extremely hard when dry and which restricts permeability.

The proportions of grassland and forest that make up the vegetation mosaic are sensitive to long-and short-term weather variations. Prolonged periods of reliable rainfall result in forest expansion at the expense of grassland. Dry periods produce conditions for fires that maintain and increase the grasslands. Also, fire resistant species of trees such as post oak and black oak increase.

This is prime habitat for deer, especially during the fall acorn mast, as well as for prairie specific species such as prairie chicken (*Tympanuchus cupido*) and prairie pocket gopher (*Geomys bursarius*). However, it is not necessary to infer that bones of prairie species necessarily represent game taken during excursions into the upland savannas. The riverine environment is quite varied, and these species might have occurred in the near vicinity of the cave. Furthermore, clearing and burning by the prehistoric inhabitants would have produced open microhabitats. The ethnobotanical and zooarchaeological samples taken in testing excavations are suggestive, but larger samples with good temporal control are necessary for discerning patterns of environmental use.

PREVIOUS INVESTIGATIONS

General Interpretations of the Ozark Archeological Record

Although our knowledge is rapidly increasing, the Ozarks region is not one of those rare areas to benefit from a long-term, coordinated program of research. Much of the information about the prehistory of this region has resulted from the investigations and reports of amateurs, and more recently, by various, widely scattered cultural resource management (CRM) investigations. CRM studies have mostly involved surveys and occasionally limited testing. There have been few large scale site excavations involving multidisciplinary analysis. There are numerous geographic and temporal gaps in our knowledge. Hence, interpretations of the regional archaeology seem to focus on missing data and questions of why elements are missing.

Isolation has been a common theme in characterizing Ozark prehistory. Only recently has it been suggested that the perceived isolation of this area may be a factor of biased and missing data (Cf. Jolly 1981; Brown 1984; Reeder 1988). The inhabitants of the Ozarks, particularly the Central Plateau, most likely were not isolated from developments elsewhere. They probably were in contact with people in the major river zones. They probably emulated groups living in the major river zones, or they may even represent outlying participants in a cultural system centered in the major river zones.

While not isolated, the area probably was marginal and environmentally limited, which inevitably precluded full participation in cultural developments in neighboring regions. The key developments that characterize the Middle Woodland and Mississippian periods were based on the development of social formations to organize and regulate life in densely packed villages. Yet, the Ozarks capacity to support dense populations and crowded villages was extremely limited.

Hence, while it would be a mistake to give up on a search of the bottomlands and buried sediments for possible Middle Woodland villages, it would also be a mistake to ignore the distinctive environmental parameters within which the inhabitants of the Ozarks had to operate. Alluvial soils and wetland habitats are extremely limited in the Ozarks. Yet, for the prehistoric hunter-gatherer riverine habitats, particularly wetlands, they were the most productive for obtaining subsistence resources, including edible wild plant, fish, and game (Goldstein 1983). Alluvial soils were the most productive for premodern agriculture.

The environmental marginality of the Ozarks is documented in the historical record of the extreme hardships suffered by Native American groups who were moved here in the early nineteenth century. By the mid-1820's, wildlife in southwest Missouri was becoming scarce (Rafferty 1980:36). Undoubtedly, the use of firearms hastened depletion of game; yet, human population levels throughout the Ozarks at this time were generally less than two inhabitants per square mile (Ibid.:58). Even with agriculture, starvation occurred. A letter from the chief of a group of displaced Delawares to General William Clark reports:

> Last summer, a number of our people died just from want of something to live on. . . We have found a poor, hilly, stony country and the worst of all no game to be found on it to live on [Ingenthron 1970:140].

Previous Investigations in the Gasconade Study Unit of the Central Ozarks

The most thorough and recent summary of local archaeology is Robert Reeder's dissertation, *Prehistory of the Gasconade River Basin* (1988). Following Reeder, the history of local archaeology is divided into three periods -- Early, Intermediate, and Recent.

Early Period Investigations

While archaeological sites and remains are reported in late nineteenth century local histories, the first professional archaeology conducted in the region is that of Gerard Fowke of the Smithsonian Institution. In a 1922 publication, he reports his excavations at Miller Cave along with investigations in 36 other caves in Pulaski County. He also reports investigations in 10 other Ozark counties including Shannon, Texas, Dent, Phelps, Camden, Miller, Maries, Osage, Cole, and Morgan. Further local area investigations are reported in a 1928 publication (Fowke 1928).

Fowke, like many early Americanist archaeologists, was insensitive to micro-stratigraphy. He was familiar with Old World archaeology and could only conceive of broad cultural changes because of the very great time depth of the Old World archaeological record. Although he must have dug through numerous stratified deposits representing thousands of years of prehistory, he failed to discern the subtleties of the cultural stratigraphy. Summarizing the results of his explorations of Ozark caves he notes:

> . . . whatever may be the depth of the deposit containing them, the artificial objects exhumed are uniform in character from top to bottom; the specimens found on the clay or solid rock floor are of the same class as those barely covered by the surface earth [Fowke 1922:15].

And he concludes his discussion of Miller Cave by saying:

> There is no way in which the age of the deposits . . . can be determined. The accumulation of ashes . . . would certainly imply the lapse of several centuries, perhaps a thousand years of continuous occupation. Intermittent habitation would lengthen this period [Ibid.:81].

In addition to Fowke's work, the data recording of Leonard Blake is of particular interest to the present study. His photographic record includes a series of pictures taken in 1939 that document the condition of Miller Cave and related components in the near vicinity, namely, the petroglyphs on this same bluff and a rock cairn on the bluff top. This record is discussed in further detail in Chapter 2.

An early attempt at classifying local artifacts is a 1938 paper by Franklin Fenega (1938). He describes and classifies pottery from Ozark caves including four sites in Pulaski County. Fenega compared these ceramics with pottery found elsewhere and distinguished two types: grit-tempered sherds associated with Woodland cultures and shell-tempered, Mississippian pottery. While Fenega recognized the cultural distinctiveness of these assemblages, he failed to appreciate their stratigraphic relationship.

Intermediate Period Investigations

Reeder's "Intermediate Period" encompasses the years between the late 1940s and the early 1970s. A principal distinction from the preceding period, besides the sheer increase in the number of investigations, was an awareness of stratigraphy and an emphasis on chronology building. The period begins with a four part survey of Missouri archaeology by Carl Chapman (1946, 1947, 1948a, 1948b) in which he used the meager existing data to construct a statewide cultural sequence and to place regional cultural manifestations within the larger cultural-chronological framework. These works provided a point of departure for subsequent research. The results of intensive survey, archaeological testing, and regional synthesis in the early 1960s are seen in the works of two of Chapman's students -- Robert Marshall, whose efforts were focussed on the Meramec drainage (Marshall 1958, 1965), and Bruce McMillan, working on the Gasconade drainage (McMillan 1963, 1965). As a result of work at a number of sites, Marshall defined the Maramec Spring Focus as a local Late Woodland cultural manifestation.

McMillan tested a number sites in the Gasconade Drainage and visited and surveyed many more, including Miller Cave (McMillan 1965:18, figures 2 and 5). At Merrell Cave (23PU64), downstream on the Big Piney River, he conducted stratigraphic investigations where he identified a Maramec Spring component overlying a preceramic stratum that included Early Archaic diagnostics defined as the "Tick Creek Complex." The complex was defined on the basis of the Merrell Cave materials and materials from other sites, most notably Tick Creek Cave (26PH145), excavated and reported by Ralph Roberts, amateur archaeologist (Roberts 1965). Although the Tick Creek Complex is still an operating taxon, it has been shown that McMillan's original definition included a mixture of Early, Middle, and Late Archaic materials (Chapman 1975:133). A recent, more useful definition restricts the complex to include just the Early Archaic diagnostics (Reeder 1988:185ff).

By the end of the "Early Period," it was clear that the Ozarks had experienced occupations during all of the major periods of Midwest prehistory. Although human presence could be documented, no site had been subjected to state-of-the-art interdisciplinary analysis including ethnobotanical analysis, faunal analysis, and radiocarbon dating. Tick Creek Cave was unusual because an in depth faunal analysis had been performed (Parmalee 1965). However, there was very little data for addressing questions regarding prehistoric lifeways. The overriding concerns with solving the problems of cultural-chronological systematics had forestalled research focussing on prehistoric subsistence and patterns of mobility and settlement, let alone concerns with reconstructing social systems or ideologies, and much less, the processes of long-term culture change. Attention was focussed on large sites, preferably ones with promise of stratified components. Survey and reconnaissance were largely confined to river valleys. Caves continued to be a central focus, as in the preceding period, because caves have the potential for deep buried, well-preserved deposits. The uplands and small ephemeral sites were largely ignored. No attempts were made to analyze patterns of site distribution or to interpret prehistoric settlement patterns.

Recent Period Investigations

The beginning of the "Recent Period" is marked by passage of the Archaeological and Historic Preservation Act of 1974, the "Moss-Bennett Act," and the implementation of Executive Order 11593. These statutes created a framework for

funding cultural resource management measures in advance of all construction projects involving full or partial federal funding. These measures include identifying significant cultural resources, both archaeological and architectural, identifying the potential impact to these resources, and mitigating damage and data loss that might result from the project in question. The result has been a dramatic increase in the number of archaeological investigations in this region.

Three agencies in particular have left a most visible and voluminous contribution to the archaeological literature for this region through their sponsorship: the Missouri Department of Highways and Transportation (MHTD); the USDA National Forest Service (specifically, the Rolla and Houston Ranger Districts of Mark Twain National Forest); and the Department of the Army (Kansas City District Corps of Engineers and Ft. Leonard Wood).

Major contributions of the MHTD sponsorship of local archaeology have been related to the construction of 20 km of Route 63 in Maries County. A number of significant archaeological investigations resulted, beginning with the initial survey (McGrath 1977) which traversed topographic settings previously ignored, namely, smaller tributary drainages and upland areas. Numerous sites identified in the initial survey were then tested (Cooley and Fuller 1977; Reeder and Oman 1979). A large-scale data recovery project was conducted at one of these sites, the Feeler Site (23MS12), a large multicomponent site (Reeder 1982). This project represents the first large multidisciplinary project in the Gasconade Drainage and incorporated ethnobotanical analysis, faunal analysis, and paleo-environmental reconstruction (Reeder 1988; Voigt 1982; Johnson 1982).

Thousands of acres of Mark Twain National Forest lands have been archaeologically surveyed, and testing has been conducted on many sites identified in these surveys. The Rolla and Houston Ranger districts adjoining Ft. Leonard Wood have received considerable attention (Moffat et. al 1985; McGrath and Ray 1987; Klinger and Cande 1985; Klinger and Kandare 1988a, 1988b, 1989; Purrington 1985). For the most part, survey tracts have consisted of relatively small, noncontiguous parcels slated for timber sales. Yet, the work has contributed useful data on the distribution of sites by providing a sampling of a range of topographic settings. Also, the information has shed light on the range of site types to be found in this region.

In 1976, Erv Garrison examined a 39 acre air-to-ground weapons range on Ft. Leonard Wood reporting no finds (Garrison 1976). Since this first Army-sponsored survey, over 23,000 acres (9,000 hectares)[2] of the 70,000 acre (28,000 hectare) military reservation have been covered by archaeological field surveys (Moffat et al. 1989; McNerney 1990, 1992a, 1992b; McNerney and Neal 1992; Niquette 1984, 1985; Niquette et al. 1983; Purrington and Turner 1981). This figure includes 7,200 acres (2900 hectares) surveyed in 1992 simultaneously with the Miller Cave project (Baumann and Markman 1993, Markman and Baumann 1993). The work on the base has included intensive investigation of locally distinctive site types including rock cairns (Niquette 1986) and walled solution holes (Niquette 1983, 1984; Painter 1984). The Environmental Branch at Fort Leonard Wood maintains a geographic information system (GIS) database of sites. The list of site categories reflects the range sites that have been recorded and includes "open camp", "open base camp", "open village", "rock shelter", "rock cairn", "cave", "quarry", and "petroglyph."

A number of regional syntheses were produced during this period. Carl Chapman's two volume *Missouri Archaeology* (1975, 1980) presents a cultural chronological synthesis for the state with detailed region by region summaries and interpretations. The two volumes are chronologically ordered, the first ending with the Late Archaic. This work brings together information that had accumulated in the interim since his earlier survey of Missouri archaeology (Chapman 1946, 1947, 1948a, 1948b). He presents a comprehensive overview of existing knowledge just before the huge literature of CRM-sponsored reports began to be produced.

In 1987, another statewide synthesis was produced, *Master Plan for Archaeological Resource Protection in Missouri* (Weston and Weichman 1987), to consider the large volume of data that had been gathered since Chapman's volumes were published. In addition to being an archaeological synthesis, the Master Plan is a guide for administrative decision making concerning the identification, evaluation, protection, and management of cultural resources. It was written to present archaeological information in a form useful to government planners. The discussion of Missouri prehistory is organized by subdividing the state into study units based on drainage patterns. For each unit, previous investigations are discussed, a summary of

[2] About 3,000 acres of this total are lands in the northeast corner of the base that have been sold and are no longer part of the military reservation.

the regional prehistory is presented, resources or classes of resources are identified and assigned relative significance, and specific research issues and priorities are identified.

The lack of coordinated, long-term research in the Gasconade Study unit -- which encompasses the Big Piney -- is reflected in the very generalized tone of the Master Plan discussion of this study unit (Wright 1987). The author declines from assigning relative significance to resource types, claiming the region's prehistory to be inadequately documented for ranking resources. He claims information at the time of writing did not provide guidance for devising a specific list of research questions. He suggests that further work should revolve around three very general objectives: 1) the definition of cultural chronology; 2) the reconstruction of prehistoric lifeways; and 3) the explanation of cultural process. Furthermore, it is suggested that the cultural-chronological research must precede the second and third objectives, as cultural-chronology provides a necessary foundation for addressing questions of culture process.

A third synthesis of interest is Robert Reeder's dissertation, *Prehistory of the Gasconade River Basin*. Reeder's overview considers the following topical areas of research and suggests that all warrant further investigation (1988):

1) the prehistoric cultural sequence (corroborating Wright's assessment);
2) the nature of inter- and intraregional prehistoric contact and interaction;
3) the prehistoric subsistence patterns and strategies represented; and
4) prehistoric settlement patterns and systems. This topic is related to number 3 in that it can be expected that patterns of mobility and settlement reflect these: subsistence strategy;
5) prehistoric mortuary practices; and
6) trends through time of the relative size of resident human population.

He questions the validity of marginality isolation and conservatism as themes to characterize the prehistory of the Ozarks. He shows how these themes originally proposed by Chapman (1975, 1980) have been adopted and repeated in subsequent regional syntheses (e.g., Ray and McGrath 1984; Watson 1985). Apparent gaps in the archaeological record were interpreted by Chapman as periods of abandonment of the region. This interpretation was based on analogy with historical Midwestern tribes

whose territories are known to have been separated by large, uninhabited buffer areas. Also, Chapman reported a tendency for the retention of certain assemblages, particularly during the Archaic, long after they had disappeared elsewhere, implying a conservatism resulting from isolation.

Reeder (1988:19) suggests that the concepts of Ozark Highland cultural marginality, isolation, and cultural conservatism must be re-evaluated and probably rejected, citing the criticisms of James Brown (1984) and amateur archaeologist Fletcher Jolly (1981). The latter shows that, at least for the Middle Woodland period, the apparent abandonment can be attributed to biased and insufficient data. Jolly's article reports Middle Woodland ceramics from several caves in the Gasconade drainage area (Ibid.).

Brown, focussing on the Mississippian period in the southern Ozark area of southwest Missouri, northeastern Oklahoma, and northwest Arkansas, also criticizes Chapman's concept of cultural marginality and his "geographical barrier theory" (Brown 1984). His criticism is aimed at the notion that environmental marginality operated as an isolating factor and shows that the southern Ozarks' cultural traditions were part of those forming the greater Trans-Mississippi South. This may apply to the northern Ozarks as well.

Reeder summarizes his site-by-site review, presenting a revised interpretation of the region's place in Midwest prehistory. He shows that all the major periods are represented, although, many of the local period manifestations are inadequately documented.

The following discussion summarizes the current state of knowledge with regard to the major periods of Ozark prehistory.

REGIONAL PREHISTORY

Discussions of the Ozarks prehistory generally follows a chronological scheme originally formulated by James B. Griffin for the eastern United States (1952). There are four major developmental periods: Paleo-Indian, Archaic, Woodland, and

Mississippian. Each have been variously subdivided by archaeologists presenting localized refinements of Griffin's original scheme. Figure 1-8 presents a chronology for the Gasconade drainage proposed by Robert Reeder (1988) juxtaposed with a general chronology for the Midwest.

Chronological Years	Midwest Sequence	Proposed Gasconade Sequence
	Mississippian	*Late Maramec Spring phase*
A.D. 1000		
	Emergent Mississippian	?
A.D. 800		
	Late Woodland	*Early Maramec Spring phase*
A.D. 400		
		Spring Creek Complex ?
1 B.C./A.D. 1	Middle Woodland	?
250 B.C		
	[illegible] Woodland	Late Archaic
500 B.C		
	Terminal Late Archaic/ Early Woodland	
1000 B.C		
	Late Archaic	
3000 B.C.		
	Middle Archaic	Middle Archaic
5000 B.C.		
	Early Archaic	Early Archaic *(Tick Creek Complex)*
7500 B.C.		
	Dalton	Dalton
8500 B.C.		
	Paleo-Indian	Paleo-Indian
12000 B.C.		
	Pre-Clovis ?	Pre-Clovis ?

Figure 1-8. Proposed cultural-historical sequence for the Gasconade drainage (after Reeder 1988: fig. 4).

The following discussion summarizes current knowledge derived from central Ozarks data regarding each of the major cultural-chronological divisions.

Pre-Clovis

Although overviews of Missouri prehistory generally follow Chapman (1975), referring to this period as "Early Man," Pre-Clovis is used here for several reasons. The term "Early Man" is generally used to refer to cultural manifestations associated with early time-successive species of human beings; that is, physical types that precede *Homo sapiens sapiens*. There is no evidence that pre-modern physical types ever lived on the American continents. All evidence show that the first Americans were *Homo sapiens sapiens* and Chapman did not wish to imply otherwise. It is, thus, unfortunate that he chose the misleading term, "Early Man" and that others have followed his usage (e.g. Reeder 1988:219). In contract, Pre-Clovis provides a neutral term for any of the as-yet-unidentified cultural complexes that might precede the Paleo-Indian Period. The fluted Clovis point is the first clearly defined diagnostic artifact in American archaeology and its appearance marks the beginning of the subsequent Paleo-Indian period.

There are no sites or finds in the Gasconade Drainage claimed to predate the Paleo-Indian period which began 14,000 years ago. In fact, on the entire American continent, sites which claim earlier dates are rare, and all are problematic. There is some general agreement that the first inhabitants came from east Asia via what is now the Bering Sea. And, there probably is a certain amount of agreement that 20,000 B.P. (before present) would not be an unreasonably early time for the first crossing. Beyond this, all the details of this early migration are fraught with controversy.

Paleo-Indian

The Paleo-Indian Period is bracketed by the dates of 12000 B.C. and 8500 B.C., coinciding with the end of the Pleistocene Ice Age. During the course of this period, a continental ice sheet retreated from the southern end of Lake Michigan northward to a position along the Canadian border. Dramatic changes began to occur in climate and vegetation (Cf. J.King 1981). The period was also marked by the mass

extinction of numerous species of fauna -- mammoth, mastodon, giant bison, and others. In the midcontinent arctic and subarctic, species were replaced with the temperate species that characterize these areas today. Caribou gave way to deer, arctic hares to cotton tail rabbits. The ice sheets had produced a compaction of the temperate zone. With the retreat of the ice, the deciduous Woodlands expanded northward (Ibid. 1981).

The first artifacts which provide evidence of a human presence in the Central Ozarks are dated to this period. The most distinctive diagnostic of this period is the fluted point including Clovis, Folsom, and numerous regional variants. These points have a large flake removed lengthwise from the base toward the tip to produce an elongated channel or flute (Cf. Bradley 1982:203-208; Callahan 1979).

Fluted points are reported but are very rare in the central Ozarks (Chapman 1975: figure 4-3; Wright 1987; Reeder 1988). Niquette reports a fluted point found by amateurs at 23PU210 (Niquette et al. 1983). The Paleo-Indian remains have been interpreted as a reflection of a minimal usage of this area as compared to the edges of the Missouri and Central Mississippi Valleys (Reeder 1988:183). As the local data consist entirely of isolated diagnostic points, interpretation of most aspects of Paleo-Indian lifeways in the Ozarks can only be extrapolated based on data from elsewhere. Generally, it is assumed that the Paleo-Indians were highly nomadic and that subsistence was largely based on hunting. The best known sites are kill sites from the western plains where diagnostic tools have been found in association with extinct fauna, mainly mammoths and extinct bison. Less far afield, two fluted points were recovered at the Kimmswick site in east-central Missouri in association with mastodon bones (Graham et al. 1981).

Presumably, population levels over the entire continent were extremely low during this period. Survival depended on marital/genetic exchange between small, wide-ranging groups (Cf. Wobst 1974). The high frequency of interaction between groups must have resulted in a rapid flow of information from one end of the continent to the other. Such a flow of information would explain the relatively small amount of stylistic variation seen in the fluted points found widespread over North America.

The Dalton Period

In Missouri and the southeastern United States, a transitional Dalton period has been defined which falls between Paleo-Indian and Early Archaic. The bracketing dates are roughly 8500 B.C. to 7500 B.C., although, Albert Goodyear has argued, based on a detailed review and analysis of the radiocarbon and stratigraphic data, that the dates should be narrowed to 8500 to 7900 B.C. (1982). The occurrence of Dalton points in the Gasconade drainage must indicate that there was a Dalton occupation here, as wel' but so far, the points have either occurred in surface collections or in mixed deposits that also include later Early Archaic points (Wright 1987). It seems that the Dalton occupation of the central Ozarks, like the Paleo-Indian occupation, was relatively light (Reeder 1988:184-185). Two Dalton points have been found on Fort Leonard Wood lands, both at the Friendly Fire Site (23PU190). This is a large upland site that also yielded Middle and Late Archaic and Middle and Late Woodland artifacts (Niquette et al. 1983:8-53ff).

The Dalton period has been interpreted as an adaptation to the temperate deciduous forest of the Southeast, and indeed, the distribution of the point type coincides with this biome (e.g., Justice 1987:31). By about 9000 B.C., a deciduous open woodlands and temperate species probably had replaced the local boreal forests (McMillan and Klippel 1981; Reeder 1988:33), although, modern environment was not fully established until after 8000 B.C. (Goodyear 1982:390). Thus, while the environment inhabited by the Dalton people was distinctly different than that of their Paleo-Indian predecessors, it was also somewhat different from that of their Early Archaic successors. Nonetheless, this was the time when the characteristic Archaic pattern of subsistence became established across the southeastern United States with deer becoming the principal quarry (Price and Krakker 1975; Morse and Morse 1983). One the Pomme de Terre River, Dalton period faunal samples from the deep terrace deposits in front of Roger's Shelter (23BE125) show that the primary meat species in addition to deer include rabbit, squirrel, raccoon, beaver/muskrat, other terrestrial rodents, bison/elk, turkey, fish, and turtle (McMillan 1976). Notably, all are modern species. Floral remains from the Dalton component include hickory nuts and black walnuts (Ibid.). The adze, a woodworking tool, is a significant addition to the tool kit.

Although it is difficult to reconstruct the details of Dalton settlement patterns, there are clues from the distribution of artifacts. These data seem to indicate that interriverine zones -- zones away from the major drainages -- were intensively utilized for the first time (Goodyear 1982). In contrast to the Paleo-Indian points, which seem to cluster along the Missouri and Mississippi Valleys, Dalton points and points assigned to the subsequent Late Archaic period are more uniformly distributed, occurring in small valleys and in the uplands. It has been noted that the first significant occupation of caves and rock shelters in Missouri and Alabama, as well, are from the Dalton horizon and that fluted points are rare in caves (Ibid.:391).

Late Paleo-Indian manifestations on the Western Plains, immediately following the fluted point horizon and contemporary with Dalton, are identified by a number of unfluted lanceolate points including Plainview, Angostura, and Agate Basin. In the central Ozarks unfluted lanceolates seem to occur somewhat later than they do on the Plains and post-date the Dalton horizon. The Early Archaic Tick Creek Complex (*sensu* Reeder 1988), defined mainly on the basis of a group of points occurring in the deepest level of Tick Creek Cave (23PH145) in neighboring Phelps County (Roberts 1965), includes Rice Lanceolate variants some of which bear similarity to Plains types such as Angostura and Agate Basin. A more detailed discussion of the relationship between these types is included in Chapter 3. Rice Lobed, a corner-notched point, and Graham Cave Notched, a side-notched point also occur in this complex. The Tick Creek complex was also found in nearby Merrell Cave (23PU64), too, where a flexed burial is assigned to this time frame (McMillan 1965).

The Archaic Periods

The Archaic Period spans some six and a half millennia from about 7000 to 500 B.C. and is generally divided into Early, Middle, and Late subdivisions (figure 1-6). This time span coincides with the Middle Holocene geological age. During the Early Archaic, there was a further retreat of the ice above Hudson Bay. This occurrence significantly affected the Midwest by allowing the winter storm track to shift northward (J. King 1981). As a consequence, the Rocky Mountain moisture shadow that covered the western plains was extended eastward, producing a wedge-shaped tongue of broken grasslands, the Prairie Peninsula (Transeau 1935), across

Iowa, Missouri, Illinois, and Indiana. This vegetation feature, still evident today, is bordered by mixed forests to the south and deciduous forests to the north.

During the course of the Archaic, there was a gradual drying and warming trend that culminated between 7000 and 3000 B.C., an episode referred to as the Hypsithermal. During this time, which roughly coincides with the Middle Archaic, there was a maximal intrusion of prairie vegetation at the expense of woodlands. A slight retreat of prairies and associated fauna occurred between 3000 and 2000 B.C. By about 1000 B.C., the distribution of vegetation and faunal communities was stabilized to resemble that seen today (Reeder et al. 1983; Reeder 1988). A question which merits further research is how were the inhabitants of the central Ozarks affected by the shifting position of the prairie-forest ecotone during the course of the Middle Holocene?

Of the three subdivisions of the Archaic Period, the Early Archaic is the most easily identified by a set of highly distinctive diagnostic projectile points. There probably are fewer sites assigned to the Middle Archaic, dating 5000 to 3000 B.C., than either the Early or Late Archaic. This might be attributed to the fact that the point types of the period either first appear in the Early Archaic or persist into the Late Archaic (figure 3-26). Side-notched points with various type names are frequent Middle Archaic assemblages and are part of a large continuum of side-notched types that span the Archaic period. For example, the Early Archaic Graham Cave Side-Notched points probably are the stylistic predecessors of Big Sandy points, generally considered Middle Archaic. Carl Chapman suggests that materials illustrated by Fowke indicated a Middle Archaic component at Miller Cave (Chapman 1975:172), namely, three full-grooved axes (Fowke 1922:plate 29, middle) and what Chapman identifies as a Big Sandy point (Fowke 1922:plate 27, bottom row 2nd from right). The point is stylistically intermediary, might be considered a Graham Cave Side-Notched point.

In his synthesis of Missouri archaeology, Chapman acknowledged the problem of the Middle Archaic noting that, "the artifacts are not readily separable from those evidences left by the Foragers of the Early and Late Archaic" (Chapman 1975:172). But, he does not acknowledge the probable effect this has on how settlement patterns for the period are interpreted. Middle Archaic sites with small assemblages and no

radiocarbon dates, which includes almost all recorded in surface survey, are not likely to be recognized as Middle Archaic. The result is the perception that the area was either abandoned or that cultural change was retarded (Cf. Chapman 1975:172).

The Late Archaic is marked by a diversity of points, some of which may first appear in the Middle Archaic, such as Table Rock and Stone Square Stemmed and others which persist into the Woodland period, including a number of contracting stemmed points. Expanding and square stemmed become increasingly common during the period. There are a number of stemmed points whose dates can be narrowed down to the terminal Late Archaic.

Woodland and Mississippian Periods

Pottery is a key diagnostic used to distinguish Early Woodland sites from sites categorized as terminal Late Archaic. For the most part, pottery is extremely rare, even at Early Woodland sites, and virtually unreported in the Central Ozarks. Diagnostic points show evidence of human activity in the region during the Early Woodland period, but no intact site deposits have been identified. Similarly, handfuls of Middle Woodland sherds and numerous Middle Woodland points -- corner-notched, ovoid variants -- are reported from various caves (Jolly 1981), but no Middle Woodland village sites which characteristically are found in riverine settings have been identified.

Several alternate explanations for the relative scarcity of Middle Woodland sites have been proposed. Chapman (1980) suggested that Middle Woodland activity in the area occurred as long-distance hunting forays originating from distant centers such as the Big Bend center on the Missouri River. Fletcher Jolly proposed an argument much like that used later by Brown (1984) that village sites are still to be found in alluvial contexts and presumably in deep buried context.

A third alternative is offered by Robert Reeder, who proposes a Middle Woodland "Spring Creek Complex" for the Gasconade drainage (figure 1-8). The complex is essentially aceramic, and its existence is based on a number of observations (1988:197ff):

1. With the numerous recent surveys that have been conducted including the many CRM work and the surveys of McMillan (1965) and Marshall (1965), riverine settings and open sites have been sufficiently investigated to be able to conclude that Middle Woodland ceramics are essentially absent in the central Ozarks.

2. The geomorphic assessment of Donald Johnson on the Pomme de Terre (1981) and the Gasconade (1982) show that it is unlikely for sites younger than 1000 B.C. to be found buried deeper than 50 cm below surface. Materials at this depth are likely to have been brought to the surface by modern agricultural practices and evident through surface survey or shovel probe survey.

3. At the Feeler Site (23MS12), a stratum with distinctive materials was found between an earlier Late Archaic component and a dated Late Woodland component (Reeder 1982). This stratum lacked ceramics but did include a number of recognizable Middle Woodland points, mostly King's Corner Notched but also Snyders and a number of other corner-notched variants. At other sites, these points in the region have been associated with small numbers of Middle Woodland sherds.

It should be noted that not enough is known of the geomorphology of the Roubidoux and Big Piney floodplains of the Fort Leonard Wood area to know whether the Pomme de Terre or Gasconade data are locally applicable.

The local manifestation of Late Woodland, the Maramec Springs Focus -- more recently renamed the Maramec Springs Phase -- was defined by Marshall (1958) to encompass materials from Chapman's Highland Aspect (1948a:100-110). The Late Woodland period is the most visible and best documented period in the region. We have burial data (Niquette 1986), ethnobotanical data, and faunal data (Voigt 1982; Reeder 1982) for this period. Nevertheless, this single period encompasses a very long time span. Undoubtedly, the Maramec Springs Phase can and will be subdivided when more information is available. A radiocarbon date of A.D. 500 ± 90 was obtained from a Maramec Springs Phase cairn (Niquette 1986), which probably dates the onset of the phase. Presently, this assay and one other, a dating of A.D. 725 ±

165 from 23PU313 (Niquette 1984), are the only radiocarbon dates for Maramec Springs. The appearance within the assemblage of shell-tempered sherds in low frequency and the occasional occurrence of items such as shell discs indicate that the Maramec Springs cultural pattern persists in some form into the second millennium A.D. and overlaps the Mississippian period, as has been suggested (Cf. Chapman 1980; Reeder 1988).

Several significant technological developments occurred during the course of this phase including the adaptation of horticulture and the bow and arrow. The latter is evidenced by the appearance of small flake points, the most common in this area being the Scallorn point. Evidence of horticulture comes from the carbonized remains of maize, chenopodium, and marsh elder from the Maramec Spring component of the Feeler Site (23MS12), an open site on the Gasconade floodplain. These data lay to rest an earlier suggestion that the Maramec Springs Phase is nonhorticultural (Geier 1975). Unfortunately, the radiocarbon assays from the Feeler Site were unsuccessful, and temporal placement of the site must be based on stylistic data alone. While the site offers a broad array of information, these data raise many questions regarding the local sequence of Late Woodland development and the relationship between the central Ozarks and areas where more typical Mississippian developments occurred.

Cultural Directions in Midwest Prehistory

Site distributions during the course of Midwest prehistory might be broadly characterized by alternating periods of clustering within major stream valleys and wide dispersion into the interriverine areas and minor stream valleys (Cf. Hall 1980; Munson 1988). For instance, we find Early Archaic sites and materials are frequently found in upland regions as well as in buried contexts in alluvial zones. Middle Archaic remains are largely confined to riverine zones (Cf. Brown and Vierra 1983). Late Archaic sites and materials are found on virtually all topographic settings. The alternating patterns continue into later prehistory. The Middle Woodland and Mississippian periods are characterized by virtual abandonment of the interfluves. Again, settlements were largely concentrated along larger stream valleys (Cf. O'Brien et al. 1982; Conrad 1981). Late Woodland, like Late Archaic sites, are found over the entire landscape (Ibid.).

The Middle Archaic focus on riverine areas may reflect a response to climatic conditions. However, a more complex model has been proposed by Patrick Munson (1988). He suggests that the centrifugal forces that culminated in large concentrations of population along the major waterways include a tendency for people to settle where resources are most plentiful and a biological tendency for populations to grow until resource limits are reached, as well as the inherent gregarious tendency of the human species. Centripetal forces that culminated in the dispersal of population during various periods of prehistory included resource depletion, especially depletion of terrestrial animals to a point where distances required for hunting forays would become untenable. Furthermore, ethnographic data show that resource stress caused by game depletion, also result in dispersal through village fission and warfare (Harris 1984; Vickers 1980). It might be expected that the net result of intervillage hostilities would be to increase spacing between settlements.

Munson goes on to suggest that the cycle of dispersion and clustering was punctuated by technological developments, which initially raised carrying capacity by either intensifying production or increasing the efficiency of resource procurement. But eventually in each cycle, the rise in major river valley populations resulted in resource stress. Specifically, the development of stone boiling techniques in the Early Archaic may have increased the efficiency of nut meat extraction by a factor of 17, which in turn may have resulted in the Middle Archaic concentration of population in the wooded stream valleys.[3]

Although the trajectory of Midwest prehistory has a cyclical tendency as identified by Munson, there is also a very general single direction with regard to strategies of settlement and subsistence that was identified earlier by Caldwell (1958) and elaborated from a worldwide perspective by Cohen (1977). Looking at developments on a broad temporal scale and at a very general level, it is evident that there is a movement from wide-ranging patterns of mobility to restricted mobility and

[3] An alternate explanation for the riverine focus of the Middle Archaic as it pertains to the Illinois Valley is provided by Brown and Vierra (1983), and may be applicable to other major stream areas of the Midwest. The authors note that during the Middle Holocene aggredation of the riverbed gradually decreased surface relief. The result was an increase in the expanse of slackwaters in the bottoms. The increase in backswamp habitats increased the amount of prime food resources and drew people to the floodplains. With increasing floodplain productivity, this zone came to dominate.

from a focus on a limited range of large quarry to a diverse range of small animals. The archaeological data also show an increase in emphasis on plant foods with an increase in technology devoted to the processing of plant foods. All of these developments reflect adjustments to changing demography, namely, an increasing crowded landscape, and undoubtedly, the adjustments in turn fostered population growth. This direction characterizes the Archaic period and continues through the Woodland period into the Mississippian period.

Several indicators in the archaeological record are related to these general trends. The adjustments to a decreased mobility must have involved an increased emphasis on storage and ceremonial trade. The latter functioned, much like storage, as an investment or hedge against local shortfalls. Evidence of ceremonial trade is manifest in the appearance of items made from exotic raw material. At the same time, there is an increase in regional stylistic diversity, which provides evidence of decreased mobility in day-to-day pursuits. Very importantly, new subsistence strategies also meant the development of more complex and diversified settlement systems on the local level (Cf. Keegan 1987; B.Smith 1992), a movement from a nomadic lifestyle characterized by frequent residential moves by small groups consisting of one or several families to the development of a pattern of logistical mobility as defined by Binford (1980). This pattern of mobility is characterized by forays of small work groups from large residential base camps to exploit specific resources in the surrounding environment. In the Late Archaic, base camps were located in areas of maximum biotic diversity, mainly at the edge of river valleys.[4] Later, in the Woodland and Mississippian periods, the river valleys became even more of a focus of settlement with an increased emphasis on plant husbandry, then horticulture, and eventually corn agriculture (Cf. Keegan 1987; B.Smith 1992).

The alluvial valleys must have been a key component of the Ozark settlement system during much of the Archaic and all of the subsequent periods. Yet, these areas were largely ignored by archaeologists for many years. James Brown has shown how biased site data have colored our perception of the prehistory of the Ozarks, producing the characterizations of marginality, conservatism, and isolation (Brown 1984). Caves and rock shelters, because they frequently yield spectacularly preserved deposits, drew

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[4] However, it has been suggested that the concentration of Late Archaic sites along the floodplain edges may be the result of differential preservation rather than cultural preference (Yerkes 1987:6)

attention away from other sites. For instance, Fowke's survey and excavations reports (1922, 1928) -- which for many decades constituted the main corpus of published data on the local area -- are almost entirely devoted to cave and rock shelter explorations. The formulation of a distinctive "Ozark Bluff-Dwellers" culture by Harrington (1924, 1960) deeply affected generations of archaeologists and can be seen echoed in Chapman's interpretation of regional prehistory (1975, 1980). Most caves and rock shelters probably represent places where specialized activities took place; thus, deposits represent only a partial inventory of a diverse and complex material culture. Trubowitz, for instance, has been able to demonstrate from the remains at the Swearington Bluff Shelter (3CW7) in Arkansas, two types of special usage, turkey trapping, and short-term residence (1980). Miller Cave is probably one of the more habitable cave sites; yet, it probably served as a specialized component of a complex settlement system during much of prehistory as will be discussed in Chapter 3.

This highly generalized model provides a framework for explaining current data for the Midwest and generating research questions that might be addressed through a long-term, coordinated program of local research. At this point, a refinement of chronology is a most pressing issue and must be resolved in order to test the cause and effect relationships suggested by processual models such as Munson's. The current cultural chronology for the Archaic is based mainly on a point typology in which few of the critical diagnostics have been dated through radiocarbon dating of firmly associated material.

PREVIOUS INVESTIGATIONS AT MILLER CAVE

At the outset of the 1992 project, there were two principle sources of information about the archaeology of Miller Cave and the level of disturbance that might be anticipated: 1) the 1922 published report of Gerard Fowke (Fowke 1922) and, 2) the photographs taken by Leonard Blake during a visit to the cave in September 1939.

Gerard Fowke's 1922 Excavation Report

Fowke's report provides the impression that a very thorough excavation was conducted. The report includes a map (figure 1-4), but unfortunately, it does not indicate the location of excavation units or profile drawings. Furthermore, the map is

a sketch map, not drawn to scale, and is incorrect with regard to orientation (compare figure 1-4 with figure 1-5).

The report text provides measurements regarding the location of finds, mostly burials. However, Fowke was not very precise in identifying the points of reference from which these measurements were taken. For instance, burial locations are given in distances measured in feet from the "mouth of the cave" and from the "east wall." Depths of finds are given in feet, but today it is impossible to discern the elevation of the original surface.

Key phrases imply that Fowke felt it his duty as a scientist to be as thorough as possible in his subsurface explorations. He states, for instance:

> No examination of a cavern is complete or is to be deemed satisfactory unless a depth is reached where the geological deposits are undeniably of such age as to antedate the possible appearance of man upon the scene. This is not assured until the excavation has reached the original floor, which may be either the bedrock or the clay left by the eroding stream when its volume had become diminished from any cause that it was no longer able to keep the channel cleared out [Fowke 1922:15-16].

He also states in specific reference to the excavation of Miller Cave:

> The entire distance worked over, from the front margin to the line where no further advance could be made, at 14 feet from the water [pool], was 91 feet. No spot that could be reached throughout this length was left undug [Ibid.74].

It was discouraging, indeed, to read the latter statement. However, as the prior statement implies and as the excavations confirmed, he was not prone to spending time excavating clay levels or the darkened portion of the back of the cave, for that matter. He gives specific information about three locations where his crew dug into the clay levels and all are within 20 meters (65 feet) of the mouth of the cave. First, he seems to have dug down to bedrock at 5.5 meters (18 feet) in from the mouth. Some of the larger rocks he describes here are probably the large roof fall pieces shown in figures 1-8 and 1-9, appearing on the cave map as a cluster of roof fall pieces at the top of the slope that rises from the mouth (figure 1-5):

> At 18 feet from the mouth, the rocks became larger and so numerous as to be almost in contact, projecting above the ashes and imbedded in the

> clay down to bedrock; it [the bedrock] became lower toward the interior, with its surface everywhere rough and irregular.
>
> The rocks were too large to be either moved or broken up, and owing to the condition of the roof, an attempt to reduce them by blasting would have been attended with great danger; so, they were perforce left in place and as much as possible of the clay between and under them dug away. . . As some of them weighed several tons, the danger became too imminent, and efforts to continue along the bedrock had to cease. Two other attempts were made to get to the bottom; one at 40 feet from the mouth just beyond the large rocks on the surface, and one 15 feet farther in. The last one started on an area 8 by 15 feet, which would have been ample if the sides could have been carried down even approximately straight [Fowke 1922:65].

Another key passage indicates that for much of the main chamber, his excavations terminated at the clay level:

> The red clay *which had formed the floor of the excavated area* from the mouth of the cavern to well past the central portion suddenly dipped to the north and to the east shortly before reaching the corner of the west wall [Ibid.: 79, emphasis added].

The 1992 excavations confirmed that intact deposits still occurred in the lower clay levels of the main chamber beyond the areas where Fowke attempted to reach bedrock. It was evident that Fowke and subsequent collectors concentrated their efforts on the dry, well-lit portions of the main chamber and on the loose aeolean deposits above the clays, what Fowke refers to as the "ash" levels. These deposits are very easy to dig and still yield substantial volumes of archaeological material. Figure 3-1 shows the relative volume of material in each stratum of the test excavation of Trench 1. The drop-off in artifact density below Zone 1, the reworked aeolean stratum, is very dramatic. It is hard to imagine how dense the deposits must have been before they were first excavated. Fowke must have become quite discouraged by the diminishing returns as he progressed into the clays of Zone 2 and seems to have avoided them as he proceeded toward the back of the main chamber.

Fowke and others have also avoided the pool, and our efforts show that not only is there little if any cultural material to be found here, but there is very little sediment to form a matrix for the rocks. A single test unit, Test Unit 2, was placed

below the level of the high-water line visible on the cave wall (figure 1-5); about 5 to 10 cm of clay covered a talus of cobble and boulder-size roof fall.

Fowke's report is important, not only for the information provided about the cave and his work in the cave, but for the information about related sites in the near vicinity, most of which are now destroyed. Fowke writes:

> From the mouth of the cave, several hundred acres of fertile valley can be seen along both banks of the river. In the bottom land lying nearest to the stream -- which itself is entitled to be called a creek -- and extending southward to Miller's residence, partly on the upper terrace, but mostly on the low land, was a village site on which were formerly many small mounds which from the description were undoubtedly house mounds. Mortars occur in numbers, while fragments of pottery and flint as well as many unbroken implements were formerly abundant to a depth of several inches. On the opposite side from the cavern, in the angle formed by the abrupt turn of the river, is another village site. A ditch, with an interior embankment about 6 feet high, formerly extended in a curved line across the point. This fortification was about 600 feet long, coming to the river bank at either end. In the part thus protected were many low, small mounds placed close together but quite irregularly. These were probably house mounds. No trace of any of this artificial work is now apparent except that a difference in color may be seen here and there when the soil is freshly turned, all the earthworks having been plowed and dragged level as interfering with cultivation. A great amount of broken pottery, flint implements, and fragments of animal bones has been uncovered here. In fact, the field is known locally as the 'place where the Indians made their pottery' [Fowke 1922:58-59].

He goes on to mention three cairns found on the ridge top above the cave, noting that "they have been so searched through that scarcely a stone remains in its proper place" (Ibid.:59). One of the cairns remains today. He also notes "a site of flint-working industry, a space 40 or 50 feet across being strewn with spalls, flakes, and chips" (Ibid.).

Fowke's report includes illustrations of three images from a group of petroglyphs that are found on a ledge less than 100 meters up a path from the mouth of the cave. Although most likely associated with Miller Cave, this site has been given its own Archaeological Survey of Missouri site number, 23PU255. The carvings are found on large blocks that have broken from the sheer rock face. From

descriptions following Fowke's visit, it is evident that the rate of destruction through acts of vandalism has accelerated over the years, obliterating most of the images. Fowke describes:

> On the surface of two of these [large blocks] are about 25 figures, pecked into the stone apparently with a pointed flint implement. One of them, measuring 6½ by 30 inches, shown in figure 11, bears some resemblance to a flying bird. All others are of uniform design, an oval or elliptical figure with straight line or bar passing through an opening in one end. These vary from 4 to 18 inches in length; two of them are shown in figure 12.

There is no trace of the bird-like figure. Some of the "bar passing through an opening" depictions still remain (figures 1-9 and 1-10).

As part of the current project, inquiries were made to ascertain the status of materials and records from the Fowke excavations at Miller Cave. There are some 700 catalogue numbers for items in storage from Miller Cave, which is something less than the list in his report (1922:81) of "objects shipped to the National Museum." The Smithsonian archive has very little beyond that which is reported. There is a sheet showing a corrected sketch map of the cave, and there are three large tracing sheets with tracings of seven petroglyph images done in blue chalk; two of these, both bar-in-opening depictions, are shown in the published report.

The 1939 Photographs of Leonard Blake

Leonard Blake's personal photographic album includes 14 views of the cave itself as well as pictures of significant features in the near vicinity, namely, a rock cairn on the ridge above and the petroglyphs. For each photograph within the cave, Blake recorded the approximate camera position and angle on a copy of the map from Fowke's publication (figure 1-4). It is evident that this information was recorded from memory some time after the photographs were taken, as some of the mapped positions are incorrect. For instance, number 9 was actually shot standing near the mouth of the cave, not near the back as indicated. Numbers 11 and 12 were actually taken standing much closer to the "east" wall and farther back. Nonetheless, with a little effort, all of the photographic positions could be found, mostly using the ceiling lines as a guide and moving to obtain proper perspective. Unlike the ceiling, the floor has been altered significantly since Blake's photographs. It is evident, for instance, that a

Figure 1-9. Miller Cave petroglyphs. Photograph taken by Blake in 1939. Compare with figure 1-10.

Figure 1-10. Photograph taken in 1992, documenting the degree of destruction that has occurred over time. Compare with figure 1-10.

great deal of erosion has occurred at the mouth of the cave. The very tips of rocks shown in Blake's photographs now appear as fully exposed boulders (figure 1-7). Of course, Fowke seems to have exposed these boulders in his excavations, then he presumably back-filled. It is also apparent that various fairly large pieces of roof fall have been rolled and moved since 1939. It was not possible to obtain a position in the front of the cave to duplicate two pictures taken by Blake, because the ground surface had evidently been lowered considerably, presumably through erosion. Blake's photographs also make it clear that the most salient excavation feature presently visible, a large trench running parallel to the north-east wall of the cave (Fowke's "east wall"), was also evident in 1939 and quite likely represents the remains of Fowke's original trenching. It is also evident that much pitting in the Main Cave has occurred within Fowke's backdirt. Today, the floor looks like a mountainous lunar landscape. In Fowke's day, "The surface, except as it had been disturbed by relic hunters, was practically level from wall to wall" (Fowke 1922:65).

CHAPTER 2

METHODS

RESEARCH OBJECTIVES

Central objectives of the excavation project were to identify the site's function at various stages of prehistory and to ascertain if good contextual information could be found to better define assemblages which make up some of the more poorly known periods of prehistory, especially the Middle Archaic, the Early Woodland, and the local Mississippian period. Beyond this, it was hoped that such data might be obtained which would advance our understanding of a developmental chronology for this area. Did the area, indeed, lag behind other better documented areas in the Midwest with regard to such things as the adoption of pottery, the incorporation of domesticated plants into diet, or the development of complex settlement systems? And if so, why? Addressing these questions goes beyond the scope of a single-site project.

Thus, it was hoped that ultimately the data recovered in this project might contribute to answering larger questions concerning causal sequences and the dynamics of long-term culture change. However, the foundation for such a long-range objective is good chronological control as well as the establishment of solid principals for assessing the cultural and behavioral implications of archaeological data. Many of the processual problems identified in North American archaeology today could be addressed by refinements in chronology. Many theoretical debates revolve around identifying what is cause and what is effect. We have seen such issues resolved in the past by the acquisition of adequate numbers of dated samples from reliable contexts. For instance, it was argued for many years that the Hopewellian culture climax was a direct consequence of the widespread introduction of corn agriculture. It is now apparent that corn was not widely incorporated into diet in the Midwest until centuries after the "Hopewellian Collapse."

FIELD METHODS

The objective of recent field investigations was to identify undisturbed contexts where archaeological spatial patterns would most directly reflect the spatial patterning of prehistoric behavior. Special attention was given to identifying areas that had been previously excavated and evidence of postdepositional disturbance.

The first step of investigations was to identify the areas of Fowke's excavation based on the measurements and descriptions he provided. This was done by carefully reading the report in the cave and locating fixed points. For instance, placement of the "mouth of the cave" or "main entrance" can be variously interpreted. It might mean the drip line. It could mean the very edge of the ledge, which varies from one end of the entrance to the other, and has changed with erosion through time. On the other hand, Fowke notes a side passage of the "east wall," "39 feet from the main entrance" (Fowke 1922:74). This provides a fairly solid indication of where he placed the entrance or mouth and some guidance for locating other features from his narrative. Fowke provides measurements for all burial locations. Surveying flags were placed at each of these to provide a visual impression of where he had been digging.

A grid was staked to assist in mapping and excavation units were placed to provide data on three areas of the cave: 1) the dry well-lit area of the cave, but beyond where Fowke had attempted to reach bedrock; 2) the dry, dark portion of the cave, which had been largely ignored by Fowke; and 3) the pool. The first area is the most accessible and has soils that are the easiest to dig. Consequently, it is the part of the cave with the most evidence of past and recent digging.

Test units were place in three locations (figure 1-5). Trench 1, a 1 m x 4 m trench, was placed east-west to bisect what appeared to be a large backdirt pile. The unit was placed here to verify, if in fact, Fowke had disturbed the entire column down to sterile soil or bedrock, or if indeed, there might be undisturbed strata below the excavated material. A relatively long unit was used to allow room to conduct a stepped excavation that would facilitate achieving depth. The position of the trench made it possible to work into the backdirt pile from the previously excavated trench.

The trench was divided into two 1 m x 2 m sections, Section 1 and 2 (figure 2-1). At a depth of about 110 cm below surface, the contact between Zone 1 and Zone 2 was notated as a change in soil texture. Zone 1 is friable aeolean deposits -- the "ash" layer that was so thoroughly worked by Fowke. Zone 2 is an underlying clay level and included a fairly uniform scattering of charcoal specks. Upon recognizing Zone 2, the excavation was continued by lowering only Section 2, leaving a vertically exposed block of Zone 2 in Section 1. Time constraints did not allow for excavation of the exposed block except to remove a sediment sample for flotation.

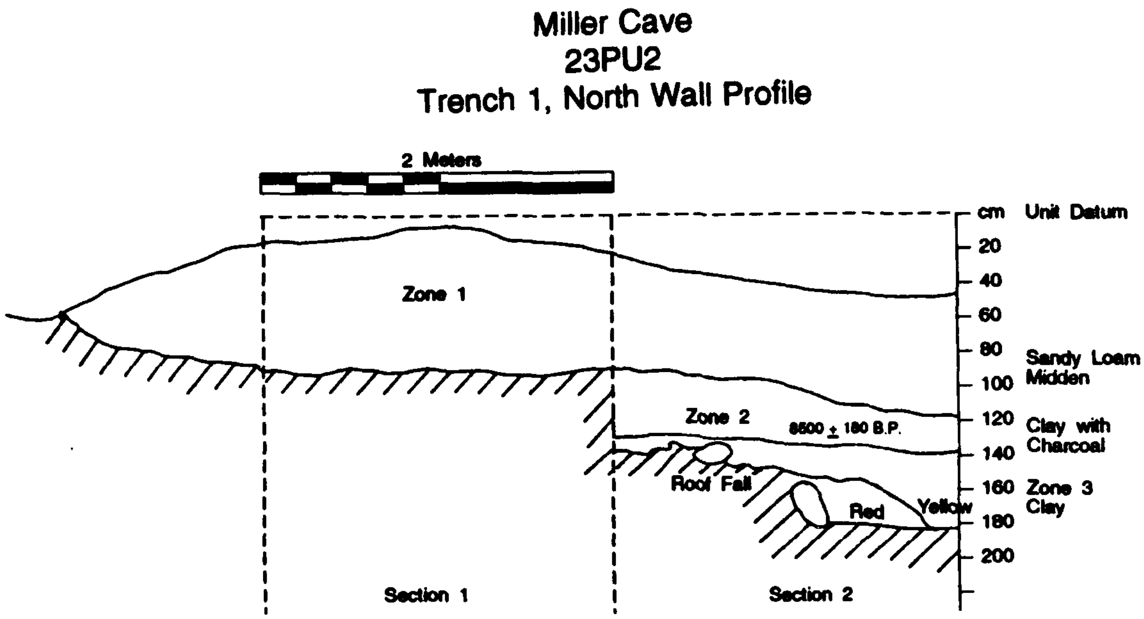


Figure 2-1. Profile showing the stratigraphy of Trench 1.

Test Unit 1 was placed in the back of the cave where the floor rises toward the ceiling (figure 1-5). In order to stand upright in this area of the cave, it is necessary to either step into a pit or find a place where the ceiling is recessed. Sharp protrusions of drip-rock make wearing a hard hat a necessity. Although Fowke's investigations included explorations of the narrowest side passages, he does not seem to have turned his attentions to the darkened portions at the back of the cave. Unfortunately, collectors seem to have made their way back into these areas. Four sizable pits were evident, averaging about 75 cm in diameter and about 40 cm deep. The crown of a dog skull could be seen in the wall of one of these pits. Test Unit 1, a 1 m x 2 m unit, was measured and staked to encompass the dog skeleton. When it became apparent that the dog skeleton continued beyond the limits of the unit, a 1 meter by 1 meter extension was plotted, Test Unit 1 Extension, to continue exploration of the feature which also includes a second dog skeleton. A sediment sample for flotation was taken from level 3 (20-30 cm b.s.) just above the dog burials. The dog skeletons were well-preserved in the dusty sediments, which in the last stages of exposing the skeletons were removed mostly by blowing.

Test Unit 2, a 1 m x 2 m unit, was placed next to the pool at an elevation well-below the water marks on the wall. Individuals who have frequently visited the cave indicated that the water level during our investigations was substantially lower than usual. Prior to settling on this location, an attempt was made to partially drain the pool with a gasoline powered pump. The effort was abandoned, as vibration and fumes were unbearable.

While significant deposits can be found in the tailings in front of many caves, the drop-off in front of Miller Cave is so steep and the ravine so deep that there is virtually no accumulation of debris. Hence, no subsurface testing was done.

Excavations were conducted in arbitrary levels, generally 10 cm thick, until reaching the bottom of the natural strata so that collections from strata would be kept separate. Sediments were screened using 6 mm hardware mesh. From significant, unmixed deposits, standard 6.25 liter sediment samples -- measured as 25 cm by 25 cm by 10 cm blocks -- were bagged for flotation and ethnobotanical analysis, one from Zone 2 of Trench 1 and one from Test Unit 1.

Propane lanterns were used for lighting all excavation units. Even for working in the trench nearest the mouth, lanterns were used to augment daylight. However, all screening was done at the very front of the cave where daylight alone was adequate.

Sediments of the upper levels generally were quite friable and were easily sifted through the mesh. However, screening was slow because of the sheer volume of shell, bone, lithics, and other archaeological material that had to be picked from the screen. In the deeper levels, artifact density was lower, but clay content was higher. Also, the silt-clay sediments from Test Unit 2 went through the screen only with a tremendous amount of effort. Fowke described these sediments in very colorful terms as "hog-wallow mud" (1922:79).

The test units were excavated to where culturally sterile strata consisting of tightly packed gravel, cobbles, and boulders were encountered.

LABORATORY METHODS

Standard procedures of washing, sorting, and cataloguing of artifacts were conducted at the facilities the Archaeological Survey of the University of Missouri, St. Louis (UM-St. Louis), which are used by Markman & Associates, Inc. under a rental agreement.

Artifacts

Artifacts were analyzed for information they might provided for dating deposits, for determining site function, and for assessing the temporally discrete economies of raw material use and tool production. Because lithics are the most durable and likely prehistoric artifacts to be found, it is not surprising that lithics are by far the most frequently represented prehistoric artifacts in the field collections.

Projectile points are the principal tools used for cultural chronological placements. Point types are assigned based on classifications created for known stylistic differences in this region. Descriptions of specific diagnostics and discussion of stylistic comparisons are presented in Chapter 3 as part of the discussion of results.

Standard cataloguing procedures developed at UM-St. Louis were used to place artifacts in morphological-functional classes (Cf. Harl and Nixon 1992). Lithic materials were divided into five categories based on their morphological attributes: chipped stone tools, flake tools, debris, pecked/ground stone tools, and other lithic materials. For analysis purposed, each of these categories was subdivided into smaller classed based on a more detailed examination of physical differences. It is assumed that morphological differences reflect functional differences that can be determined through experimental archaeology, the use of ethnographic analogy, and by consulting existing literature reporting the results of pertinent ethnographic and experimental research. It is recognized that the correlation between form and function is not perfect. Some tools can be used and probably were used for multiple functions. For instance, many projectile points were used as knives, skinning tools, and diggers. Microwear analysis is a desirable method when a high degree of precision is needed for assessing tool use but is beyond the scope and resources allocated for this project. In general there is a correlation between form and function and tools will be manufactured to perform a specific task or group of tasks.

Chipped Stone Tools

Formal chipped stone tools were first sorted based on manufacturing technique. Two major categories are bifaces and unifaces. Specimens exhibiting a wear pattern indicative a particular function were further subdivided into more functionally specific categories.

Bifacial Tools

Bifaces not exhibiting a distinctive wear pattern and whose function could not be determined were placed in the indeterminate biface category. These were then subdivided into "thick" and "thin" varieties. Thick bifaces display only primary flaking producing prominent flake scars across the artifact. The lateral edges are not retouched or they have a small amount of secondary flaking giving the edge a crude or a wavy appearance. These bifaces probably represent blanks or unfinished tools discarded during the relatively early stages of manufacture. Thin bifaces display prominent flake scars providing evidence of secondary flaking as well as evidence of tertiary flaking conducted to produce a fine, straight edge. The thin bifaces probably

represent preforms, unfinished tools discarded during the latter stages of production, or fragments of tools whose original function could not be ascertained.

Some bifaces of both varieties appear to have been recycled. These samples exhibit distinctive wear patterns either intentionally produced for use or unintentionally formed through use leaving a distinctive wear pattern or morphology similar to the utilized flake. These reworked bifaces were divided into their respective functional categories.

Knives

Knives are primarily bifacially flaked with evidence of edge wear along a portion of both sides of one or both edges. The flakes removed during use tend to vary in morphology and often produce a jagged or slightly serrated edge.

Scrapers

Scrapers are generally unifacially flaked but are occasionally bifacially flaked. The working end of the tool is usually steeply bevelled producing an arched back. Flakes are removed only from the dorsal side of the tool during use and are generally uniform in morphology. Scrapers were used in preparing hides or in wood working. Those for wood working tend to have larger flake scars and have a higher edge angle than scrapers used in hide preparation. They appear to be noticeably bevelled. Slight polishing of the dorsal surface occurs near the top of the bevelled edge.

Drills and Gravers

Drills and gravers are bifacially flaked with a bit nearly two to three times as long as wide. The bit is usually thick, nearly circular in cross section, and ends in a pointed tip. These tools often contain a hafting element. Drills were utilized to perforate materials. Gravers are usually fairly small, rarely longer than 1 cm, and are used to perforate softer materials or engrave wood, bone, or shell.

Gouges

Gouges tend to be smaller and not as thick as drills with bits only slightly longer than wide. They end in a rounded to almost square tip, whose dorsal surface is steeply bevelled. These tools were utilized in shaping or etching wood or bone.

Woodworking Tools

Woodworking tools include adzes, chisels, spokeshaves, and denticulates. Adzes are bifacially flaked with a bevelled edge on the ventral surface of the working end. As the result of utilization, a slight polishing occurs on the dorsal surface of the tool just behind the working edge. Chisels are thicker than adzes. Their working edge also is bevelled, except the bevelled edge is on the dorsal surface. These tools usually have a flat back for striking. Spokeshaves have a U-shaped notch which is extremely bevelled on the dorsal surface. Flakes removed during use come from this same side. These tools were used to produce or to smooth shafts. Denticulates have serrated or tooth like projections along the working edge often with an arched or convex back as well. These may have been used as shredders or to remove animal hides.

Projectile Points

Projectile points are bifacially flaked tools, which contain a pointed blade and a hafting element. These artifacts were usually attached to a wooden or bone shaft and used with an atlatl or bow. Through replication experiments and microwear analysis it has been shown that these hafted bifaces, especially medium and large size points, were frequently used as generalized cutting, piercing, and graving tools, not just as projectile points (Ahler 1971). These formal tools are the most useful of any category for stylistic dating.

Flake Tools

Flake tools include lamellar blades and utilized flakes. Lamellar blades are sharp, thin tools generally measuring two to three times as long as they are wide. These are removed from the core so that they have one or two medial ridges ont the dorsal surface and are triangular or trapezoidal in cross section. Lamellar blade

production represents an extremely efficient method of extracting a maximum amount of cutting edge from a minimal amount of raw material. Neither lamellar blades nor the conical cores from which they would have been removed have been recovered from Miller Cave. The implications of the absence of a blade tool technology in terms of the overall economy of lithic raw material procurement and use is discussed in the chapter which follows.

Utilized flakes characteristically exhibit secondary edge modification either intentionally formed for use or unintentionally modified by use. Microscopic examination is a preferred means of identifying utilized flakes but was beyond the scope the present project. There is no doubt that there are examples in the debris category that may have use-wear that is only evident through microscopic examination. Nevertheless, it is possible to identify some distinct utilized flake with a macroscopic approach including: cutting tools with irregular flake scars formed along both sides of one edge, scrapers with regular flake scars formed along one side producing a bevelled edge, denticulate tools with a serrated edge, spokeshaves with a U-shaped notch or dual notches which are bevelled on the dorsal surface, and small drills or gravers with bifacial flaking creating a pointed or a slightly rounded tip.

Manufacturing Debris

Manufacturing debris is the material discarded as the result of production or maintenance of chipped stone tools. This category includes percussion flakes, thinning flakes, broken flakes, angular shatter, and cores.

Percussion Flakes

A variety of flakes are formed during lithic tool manufacture. Percussion flakes have a bulb of percussion with a striking platform. Usually, these are produced during the early stages of tool production.

Thinning Flakes

Thinning flakes have a diffuse bulb of percussion. The striking platform has a steep angle and/or a faceted lip, resulting from these flakes being removed from the

edge of a stone tool. These flakes result from a biface being thinned or reworked during the middle to latter stages of tool production.

Sharpening Flakes

Sharpening flakes are similar to thinning flakes except the platform may be absent and a small notch sometimes occurs at this location. These flakes generally are removed through pressure flaking techniques using a deer antler or other type of flaking tool. Flakes of this type are generally small, most less than 1.5 cm long. These are removed during the final stages of lithic tool production when the tool is in the final sharpening stages or when hefting notches are created. They also result from resharpening the edge of a tool. Because of their small size, it is expected that they may be under-represented, as many pieces would not be retained in the 6 mm (¼ in) screen.

Broken Flakes

Broken flakes can be re-oriented to the parent material but contain neither a bulb of percussion nor a striking platform. These could be percussion or thinning flakes broken during removal, or later as a result of post depositional events. This category was used to obtain a minimum number of flakes recognizing that broken flakes may represent more than one fragment of a whole flake.

Angular Shatter

Angular shatter, likewise, does not contain a bulb of percussion or a striking platform. Unlike broken flakes, these are blocky in shape and cannot be re-oriented to the parent material. Shatter is produced during the initial trimming or preparation of the core when the heaviest blows are struck.

Cores

Cores contain negative flake scars attributed to the removal of flakes from the artifact surface. Generally, flakes are removed in a random fashion causing the core

to have a nodular or tabular form. Flakes removed from a core often are used to produce lithic tools.

Pottery

Pottery fragments were subdivided by tempering agent including grit, limestone, and shell. Body sherds were examined for thickness and surface treatment (i.e. cordmarked, plain, burnished, slipped, etc.). In addition, the rim shape was used to determine the form and function of the vessel; in this case one rim sherd seems to correspond to a bowl and the other to a jar. Rim fragments were too small for determination of the diameters of the vessel orifices or to assess percentage of the rim present.

Prehistoric Economies of Raw Material Use and Tool Production

The classification scheme provides raw data for deriving some key indicators characterizing lithic assemblages in terms of the economy of chert procurement and tool production. In turn, the economics of lithic raw material procurement and tool production provide insights into the overall economic strategies of which they are a part (Cf. Jeske 1989). For instance, Middle Woodland Hopewellian sites in the Midwest are generally characterized by expensive raw materials; that is, high grade, exotic raw materials that must be considered "expensive" in terms of human effort required for their procurement. A correlate of expensive raw materials is relatively high proportion of bifaces — tools that can be reworked and reused — and high proportions of lamellar blades representing an effort to maximize the use of raw materials. In the Hopewellian case, the pattern of lithic raw material use correlates with what might be called a logistical mobility strategy (Binford 1980). Populations aggregated in relatively large villages that served as semi-permanent bases from which procurement forays would be launched. It contrasts with a strategy of residential mobility where small groups would move from resource to resource. The maintenance of stable villages, in turn depended a great deal on implementing storage technologies and these sites are characterized by high densities of catchment pits. The classic Havana-Hopewell pots also probably served as partially buried storage containers (Cf. Markman 1988). In addition to storage, trade probably also served as a backup "insurance" that would stabilized local populations (Cf. Brose 1979). Trade could be

uses as a way of procuring support from far afield should a local short fall occur. The maintenance of trading networks is manifest by the wide-reaching movement of numerous non-utilitarian manufactured items and also raw materials.

A key element in the analysis of tne lithic assemblages from Miller Cave is the identification of lithic raw materials. The central Ozarks is an area where naturally occurring chert — mostly of moderate to poor quality — is virtually ubiquitous and it was not surprising that the quantity of non-local or "exotic" chert in the field collections was minuscule. The artifact summary discussion in Chapter 3 considers the patterns of tool production in terms of the availability of raw materials.

Three local cherts are derived from Ordovician deposits: Gasconade (Og), Roubidoux (Orc), and Jefferson City (Ojc) and are described in detail by Jack Ray (1984:229-234). Gasconade and Roubidoux cherts occur in residual deposits along the Big Piney River and Roubidoux Creek and Jefferson City, though less common in this area, occurs on the divide between the Big Piney and the Roubidoux. All of these also occur in gravel bars in these streams.

There is considerable overlap between Gasconade, Roubidoux, and Jefferson City Cherts in terms of colors and textures and there are no fossils in the chert types which can differentiate them. Thus it is necessary to create a fourth chert category — Undifferentiated Ordovician (UO) — to include the indistinguishable pieces. Typically, about 25 percent of site collections would be placed in this category by specialist with experience and a trained eye. It can be expected that the percentage might be higher for someone with less experience (Jack Ray, personal communication, October 29, 1992). Predominant colors of Gasconade Chert are blues, grays and whites which combine to form banded, mottled, and oolitic varieties or a white porcelain-like variety. Roubidoux Chert is more pink, white brown, and gray and is generally grainier and therefore of lower quality. Jefferson City Chert tends to exhibit more gray and brown colors and is often fine grained.

Osagean Chert (Mo) is mostly white but also includes cream and gray colors. It is generally fossiliferous and the presence of crinoids and other Mississippian-age fossils provide a strong basis for positive identification (Ray and McGrath 1988:128). This chert occurs in small quantities in local stream deposits but outcroppings do not

occur within the project area. Hence, while it might not be considered local, neither is it "exotic." "Non-local" might be a better designation for this type. The nearest bedrock occurrences are in the headwaters between the Gasconade and Big Piney Valleys. Roubidoux Quartzite (Orq) might also be considered "non-local" as it does not occur within the project area but is found in near neighboring areas. Quartzite typically occurs in the Roubidoux formation in the central portions of the Salem Plateau (figure 1-2).

CHAPTER 3

RESULTS AND INTERPRETATIONS

Four distinct and archaeologically significant deposits were identified in the excavations. Three of these were encountered in Test Unit 1: Zone 1 a mixed deposit, which includes Early Archaic through Late Prehistoric materials, Zone 2, an intact Early Archaic deposit, and Zone 3, a lowermost level, with sparse, non-diagnostic materials. Zone 3 probably represents a residuum with cultural materials that have migrated downward from Zone 2. The fourth deposit of importance is Zone 1 of Test Unit 1, which is an intact Late Woodland deposit. The relative density of materials in each of these deposits is illustrated figure 3-1 and a comparison of the composition of each, derived from a gross sorting, is illustrated in figure 3-2. This information is discussed in further detail in a concluding discussion of site structure later in this chapter.

In addition, two clearly sterile deposits were identified, Zone 2 of Test Unit 2, and the shallow sediments of Test Unit 2.

TEMPORAL PLACEMENT

Only one radiocarbon assay was obtained from the current investigation, which dates the Early Archaic deposits in Trench 1, Zone 2. A 10 gram sample of wood charcoal, mostly oak, was submitted for radiocarbon dating. It was given an extended counting time to increase the statistical precision. An assay of 8,500 ± 180 B.P. (Beta-53024) was obtained. Using Calib version 3.03 (Stuiver and Reimer 1993) — a computer program that calibrates assays by accounting for variations atmospheric radiocarbon over time — a sidereal date approximately 1,000 years earlier is derived: three possible intercepts are 7531 B.C., 7525 B.C., and 7507 B.C. The associated assemblage from this stratum is discussed later in this chapter. Diagnostic artifacts are illustrated in figure 3-3.

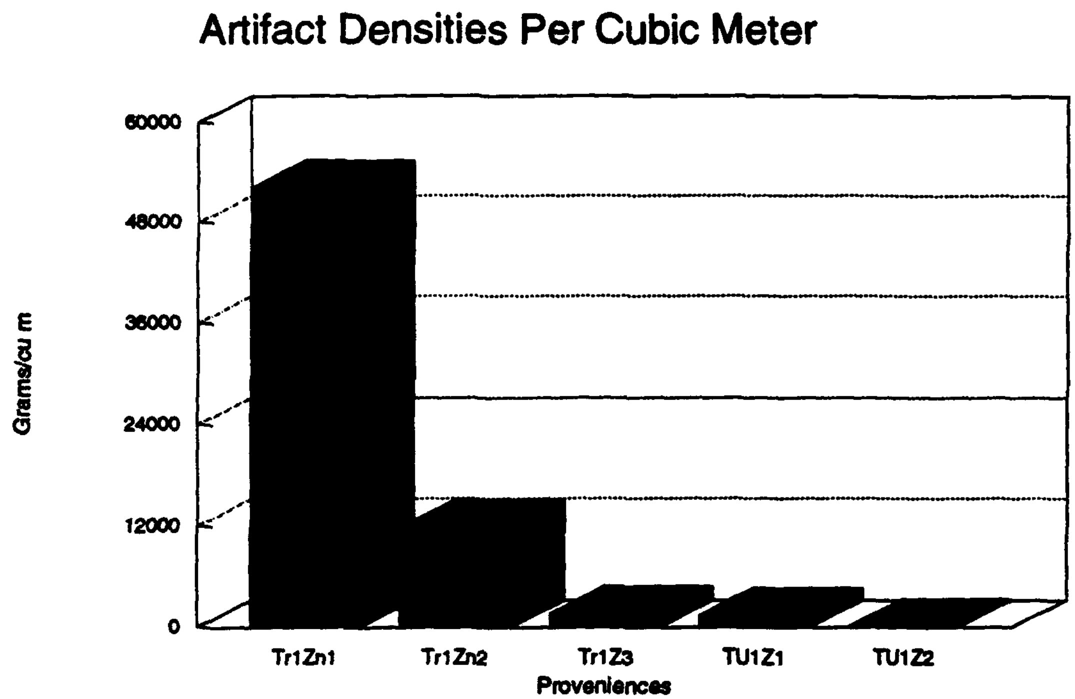
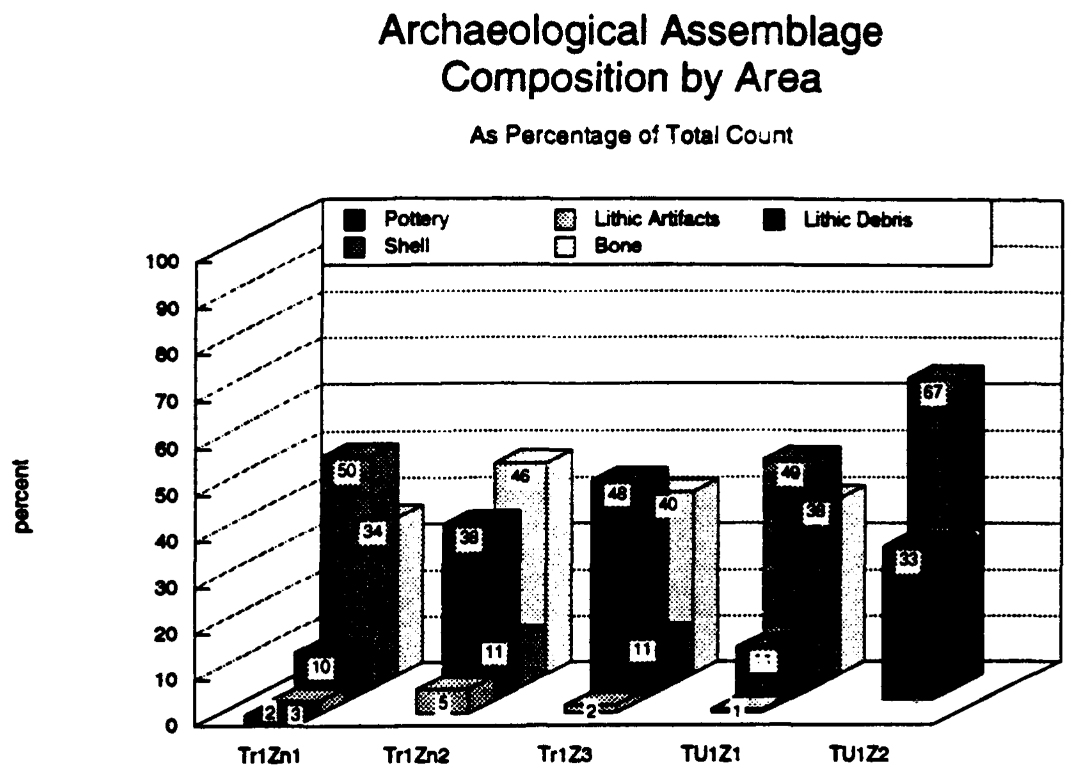


Figure 3-1. Artifact densities per cubic meter.



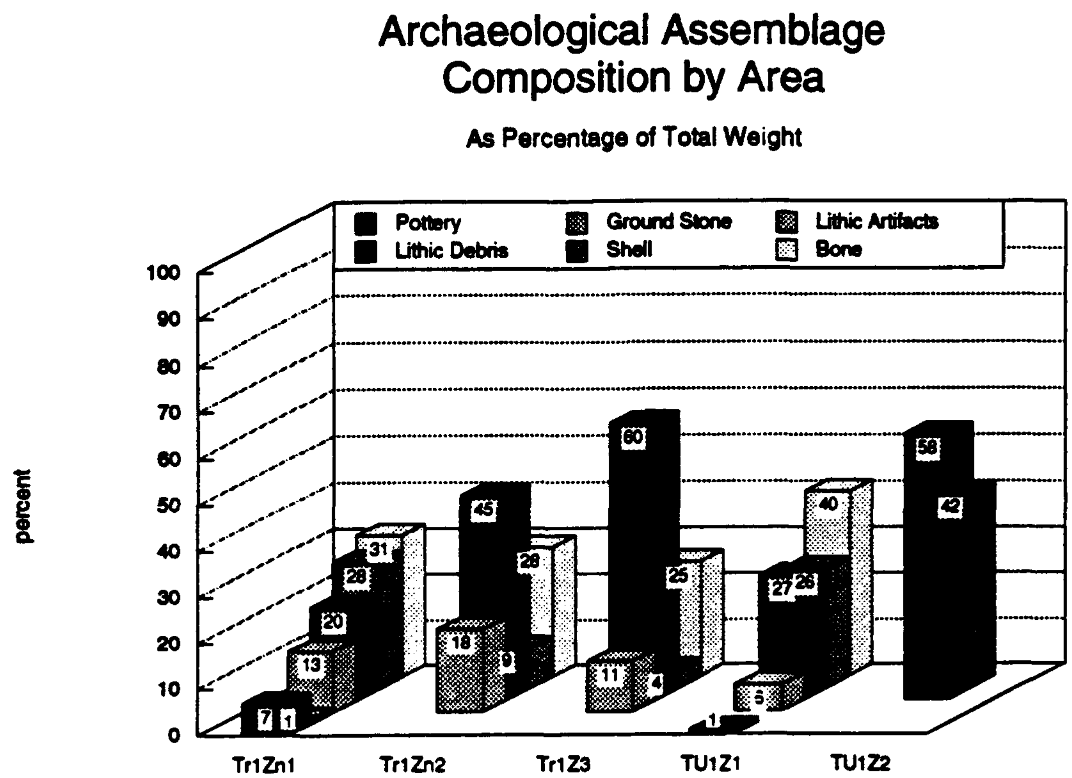


Figure 3-2. Archaeological assemblage composition by area.

	cat. no.	provenience	approx. depth below surface (cm)	identification
a	207	tr.1, sect.2, level 6, Zone 2	110-130	Rice Lobed
b	210	tr.1, sect.2, level 6, Zone 2	110-130	Hidden Valley Stemmed
c	208b	tr.1, sect.2, level 6, Zone 2	110-130	Rice Lanceolate
d	209b	tr.1, sect.2, level 6, Zone 2	110-130	Rice Lanceolate
e	191	tr.1, sect.2, level 6, Zone 2	110-130	Lanceolate base
f	222	tr.1, sect.2, level 6, Zone 2	110-130	corner notched point
g	211	tr.1, sect.2, level 6, Zone 2	110-130	Rice Lobed

Figure 3-3. Legend (see facing page). Diagnostic points from Trench 1, Zone 2, an Early Archaic stratum.

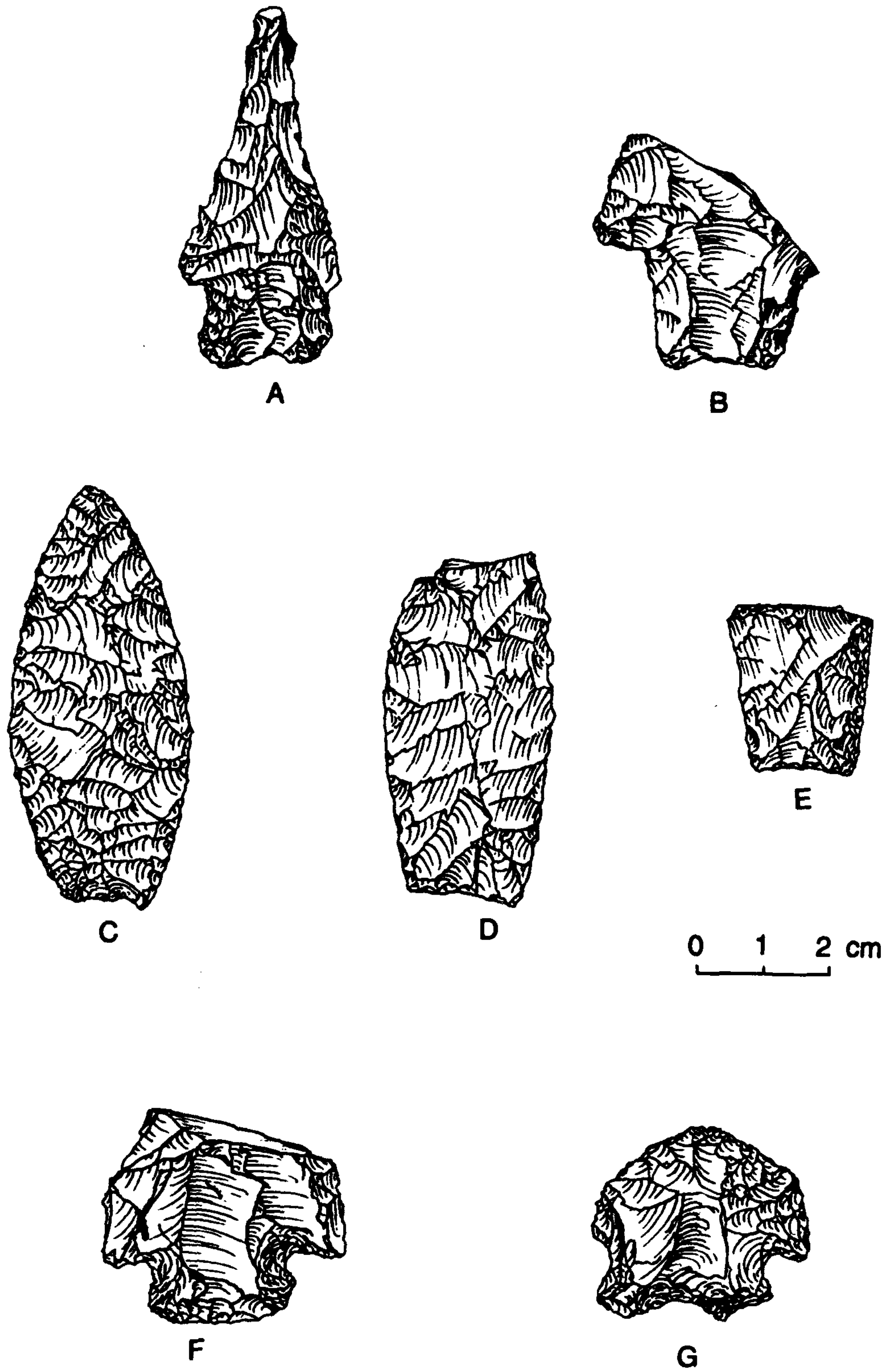


Figure 3-3. Diagnostic points from Trench 1, Zone 2, an Early Archaic stratum.

Diagnostic artifacts, mainly projectile points but also pottery, provide insight into the continued long term occupation of the cave from the Early Archaic period until the most recent episodes of prehistory. Of the 61 diagnostic projectile points recovered in this project 38 can be clearly identified as previously defined and dated types. These are described below.

Early Archaic Points

Rice Lobed N=4 (figures 3-3a, g 3-4a-d)

These are medium sized corner notched points with a deeply concave bases producing a stem with bifurcate appearance. The Miller Cave examples include two complete points (figure 3-3a, shown also in figure 3-4a and figure 3-4b), one fragmentary point (figure 3-4c), and one that has been modified into scraper. The complete examples viewed in cross section show the characteristic steeply bevelled blades produced by asymmetrical sharpening. Shoulders are prominent and blade edges are slightly incurvate. None of the four examples demonstrate the basal grinding that is sometimes found on Rice Lobed points (Chapman 1975:254). Point measurements in millimeters are as follows:

	N=	*range*	*mean*
length	3	29-59	47.3
shoulder width	3	25-37	31.4
thickness	3	8-9	8.4

Hidden Valley Stemmed N=1 (figures 3-3b, 3-8a)

The Hidden Valley Stemmed type is represented by a single basal fragment. The example shows well-executed, oblique flaking on the blade surface. Basal thinning has been achieved by removal of an elongated hinged flake producing a base that has biconvex cross-section. The piece also demonstrates grinding on the lateral

edges and base of the stem. The blade cross-section is lenticular. The maximum thickness of the fragment is 9.4 mm.

The Hidden Valley type occurs in early levels of Modoc Rock shelter in levels yielding radiocarbon dates of 8543 B.P. and 7797 B.P. (Chapman 1975:236, 250, citing Fowler 1959, Libby 1954:736-37, and Jelinek 1962:457). The Miller Cave example comes from Test Unit 1, Zone 2 and the radiocarbon date from this zone is consistent with the Modoc dates.

Rice Lanceolate N=13 (figures 3-3c-d, 3-4e-j, n-q)

These are broad lanceolate points of medium size. They are broadest in the midsection and have a thin lenticular cross-section. Bases are slightly concave. The lateral edges of the base were smoothed on ground in 11 of 13 examples. Of 13 examples, 2 demonstrate basal thinning. Examples made from good quality cherts exhibit well executed oblique flaking on the blade surfaces. Sharpening to produce serrated edges was evident in 6 out of 12 examples.

The type encompasses examples that conform to two categories, which are distinguished by Chapman but seem to from a morphological continuum: Agate Basin (1975:241-242) and Rice Lanceolate (1975:253-54). In his overview of Missouri archaeology, Chapman (1975) generally identifies illustrated examples that have a sightly stemmed or stemmed appearance — produced by a relatively high degree of resharpening or basal grinding — as Rice Lanceolate (e.g. 1975:figures 6-2, A-19). He also classes all pieces with serrated blades in the Rice Lanceolate category. However, there are pieces that demonstrate neither of these characteristics that are classed as either Rice Lanceolate or Agate Basin. The continuity between the two types is illustrated comparing two such examples, both from the Ozark Highland Region. While one of these is identified as a Rice Lanceolate point (Chapman 1975:figure 6-3a), the other is labelled as an Agate Basin point (Ibid.: figure 6-3j). Chapman also indicates that Agate Basin points are generally longer than Rice Lanceolate demonstrating a mean length of about 100 mm with range of 50 to 130 mm (1975:241), while Rice Lanceolate points are noted be between 60 and 70 cm. The latter measurements describe the Miller Cave examples that have not been heavily

	cat. no.	provenience	approx. depth below surface (cm)	identification
a	32	tr.1, sect.1, level 3	20-30	Rice Lobed
b	207	tr.1, sect.2, level 6, Zone 2	110-130	Rice Lobed
c	211	tr.1, sect.2, level 6, Zone 2	110-130	Rice Lobed re-worked into a scraper
d	74	tr.1, sect.1, level 5	40-50	Rice Lobed
e	298	tr.1, sect.1, level 11	100-110	Rice Lanceolate
f	189	tr.1, sect.2, level 5	90-110	Rice/Searcy Lanceolate
g	190	tr.1, sect.2, level 5	90-110	Rice Lanceolate
h	53	tr.1, sect.1, level 4	30-40	Rice Lanceolate
i	297	tr.1, sect.1, level 11	100-110	Rice Lanceolate
j	199	tr.1, sect.2, level 5	90-110	Rice Lanceolate (re-worked)
k	54	tr.1, sect.1, level 4	40-50	Lanceolate base
l	209a	tr.1, sect.2, level 6, Zone 2	110-130	Lanceolate base
m	191	tr.1, sect.2, level 5	90-110	Lanceolate base
n	209b	tr.1,.sect.2, level 6, Zone 2	110-130	Rice Lanceolate
o	208b	tr.1, sect.2, level 6, Zone 2	110-130	Rice Lanceolate
p	331	tr.1, sect.2, level 2	40-50	Rice Lanceolate
q	208a	tr.1, sect.2, level 6	40-50	Rice Lanceolate
r	54	tr.1, sect.1, level 4	30-40	Lanceolate base (re-used as a scraper)

Figure 3-4. Legend (see facing page). Rice Lobed and Rice Lanceolate points.

Figure 3-4. Rice Lobed and Rice Lanceolate points.

reworked. Point measurements in millimeters for the Miller Cave Rice Lanceolate points are as follows:

	N=	*range*	*mean*	*standard deviation*
length	7	41-70	58.5	8.6
width	10	21-30	25.6	2.6
thickness	13	6-9	7.6	0.8
base width	13	10-18	14.5	2.3

There are Rice Lanceolate variants that are morphologically similar to lanceolate types from the western plains, particularly Agate Basin and Angostura (Cf. Wormington 1957:138-141; O'Brien and Warren 1983). These western plains type names have frequently been applied to local materials. More data are needed to securely date the Rice Lanceolate, but the Agate Basin and Angostura types seem to occur on the high plains about 1000 years earlier than similar lanceolate points appear in Missouri. Median radiocarbon dates for Agate Basin in the type site vicinity in eastern Wyoming are 9350 B.P. and 9900 B.P. (Luchterhand 1970:47) and 9790 B.P. at Blackwater Draw in eastern New Mexico (Willey 1966:40). Angostura points — which probably have more similarity with the Miller Cave Rice Lanceolate points than do high plains Agate Basin points — are associated with a mean radiocarbon dates of 7715, 7073 B.P., and 9380 B.P. from the Ray Long site in Angostura Reservoir area in South Dakota (Wormington 1957:140).

Middle Archaic Points

Raddatz N=1 (figure 3-25)

The example from Miller Cave is a basal fragment of medium size, side-notched point. The notches are deep, semi-circular, and placed close to the base. Unlike most examples of the closely related Big Sandy type, the base is straight rather than concave. In this respect it bears formal similarity to the Raddatz type described from Wisconsin (Wittry 1959) as well as an example — identified as subclass 25.1 — from a Middle Archaic stratum at the Pigeon Roost Creek Site (23MN732) (O'Brien and Warren 1983:93, figure 5.10). While some would place this and related side-

notched points in the Middle Archaic (Cf. Perino 1971:76; Chapman 1975:242), few would dispute that these points persist long after 3000 B.C. (Cf. Stoltman 1986:213; Chapman 1975:242). Generally, side-notched points are very imprecise as time marker. A wide variety of local names have been applied to cover the continuous stylistic variations that span from Early through Late Archaic throughout the eastern United States. Deeply side-notched point dates seem to cluster around 5000 B.P. but dates span 5000 years (Cf. Cook 1976:86-87).

Late Archaic Points

Table Rock Stemmed N=1 (figure 3-5b)

A single basal fragment can be identified as a Table Rock Stemmed (Cf. Bray 1956; Perino 1968:96-97; Perino 1971:28; Chapman 1975:257-258). It demonstrates the characteristic expanding stem and broad shoulders. Retouch flaking is well done and oblique parallel flake scars which travel to the midpoint are evident on one face of the blade. The point has a lenticular cross-section and is relatively thin, measuring 7.8 mm. The blade width is 31 mm. A very similar type, Apple Blossom Stemmed, is reported in Helton Phase deposits at Koster (Cook 1976:147-48, figure 42). The Helton Phase ended before 2000 B.C. (Ibid.:70-71).

Stone Square Stemmed N=3 (figure 3-8e-f)

Examples show relatively poor workmanship and vary in size. However, all show the characteristic straight stem that is roughly square. The type is estimated to have been manufactured between 3000 and 1000 B.C. (Chapman 1975:257). All examples from Miller cave are basal fragments. Measurements are presented in millimeters as follows:

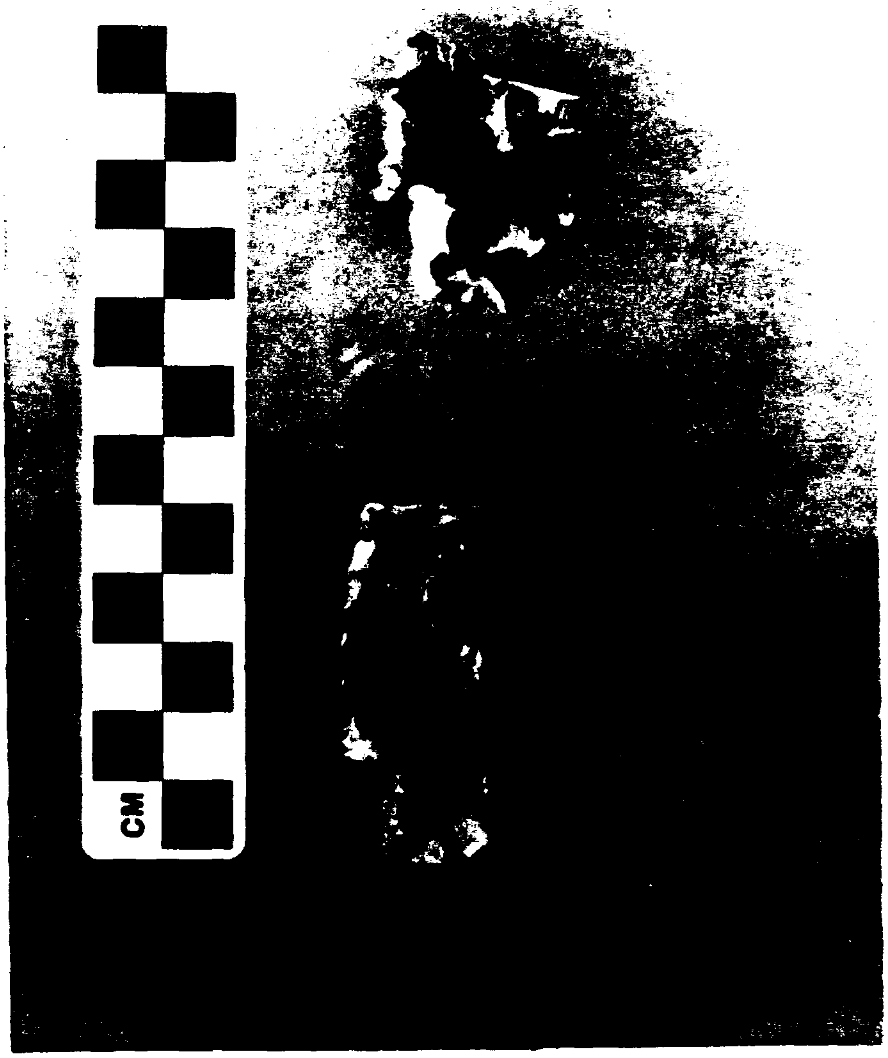
cat. no.	**241**	**241**	**76**
length	--	--	--
sh.width	28.3	24.7	32.6
thickness	10.0	6.3	8.8
st.length	13.5	14.4	13.3
s width	22.3	16.1	19.6

	cat. no.	provenience	approx. depth below surface (cm)	identification
a	75	tr.1, sect.1, level 5	40-50	Class CN10 Late Archaic point
b	260	tr.1, sect.1, level 9	80-90	Table Rock
c	198	tr.1, sect.2, level 5	90-110	Marshall Barbed
d	222	tr.1, sect.2, level 7, Zone 2	130-135	corner notched point

Figure 3-5. Miscellaneous stemmed points.

	cat. no.	provenience		approx. depth below surface (cm)
a	282	tr.1, sect.1, level	10	90-100
b	259	tr.1, sect.1, level	9	80-90
c	35	tr.1, sect.1, level	3	20-30

Figure 3-6. Rice Side-Notched points.



cat. no.		provenience		approx. depth below surface (cm)
a	261	tr.1, sect.1, level	9	80-90
b	76	tr.1, sect.1, level	5	40-50

Figure 3-7. Miscellaneous stemmed points.

Afton Corner Notched N=2 (figure 3-7a, 3-10a)

The two examples from Miller Cave have the characteristic angular outline. However, they lack the sharply defined barbs that are frequently evident on this type (Cf. Bell 1958:6-7). Measurements are as follows:

cat. no.	**117**	**264**
length	55.3	65.3
sh. width	28.1	43.0
thickness	7.5	9.7

Dickson-Waubesa N=1 (figure 3-9d)

Contracting stemmed points occur as a number of stylistically overlapping variants spanning from the Late Archaic through Middle Woodland across the eastern United States (Cf. Montet-White 1968; Bell 1958:28; Perino 1968:18-19, 1971:98-99; Jolly and Roberts 1974; Justice 1987:189-196). The example illustrated in figure 3-9d is a broad and thin point (l=60.2, w=36.5, th=7.5), with a triangular shaped blade. The base has been broken but the break has been retouched. It is a symmetrical, finely flaked piece, and in this respect differs from most local Gary Stemmed examples (Cf. Chapman 1975:308, Bell 1958:28-29), although Gary Stemmed includes enough variability to encompass this piece.

CN10 N=1 (figure 3-5a)

A single point specimen fits into a category CN10 as defined by McMillan (1965:93-94). This is a medium sized (l=61.3 mm, w=32.3 mm, th=7.2 mm) point with deep u-shaped corner notches and barbed shoulders. However, unlike usual CN10 examples, the base is convex rather than straight. In this respect and others it is very much like a point illustrated from Late Archaic level 6 at William Shelter (23PH34) (Jolley and Roberts 1974: figure 35g).

	cat. no.	provenience	approx. depth below surface (cm)	identification
a	210	tr.1, sect.2, level 6, Zone 2	110-130	Hidden Valley Stemmed
b	109	t.u.1, level 3	10-30	stemmed point
c	169	tr.1, sect.1, level 8	70-80	Early Archaic stemmed point
d	262	tr.1, sect.1, level 9	80-90	Late Archaic stemmed point
e	241	tr.1, sect.1, level 8	70-80	Stone Square Stemmed
f	241	tr.1, sect.1, level 8	70-80	Stone Square Stemmed
g	138	t.u.1, level 5	40-50	Late Archaic/Early Woodland stemmed point
h	170	tr.1, sect.1, level 7	60-70	Dyroff-like Late Archaic stemmed point

Figure 3-8. Legend (see facing page). Miscellaneous Archaic stemmed points.

Figure 3-8. Miscellaneous Archaic stemmed points.

Marshall Barbed N=1 (figure 3-5c)

The point fragment shown in figure 3-5c is a medium sized point with deep corner notches and a slightly expanding stem. The width at shoulders is 36.8 mm and the maximum thickness measures 7.1 mm. It evidently had very prominent barbs, except that both have been broken off. On typical Marshall examples the notches may originate from the base (Bell 1958:44-45). Elongated, random flake scars are evident on the blade and base and retouch flaking is evident on the blade and the sides of the base. The blade has been reworked. The point was manufactured from a medium to poor quality piece of undifferentiated Ordovician chert. Several of the thinning scars terminate in hinge fractures.

While Marshall Barbed points are noted to be associated in the Illinois Valley with terminal Middle Woodland types such as Steuben (Cf. Morse 1963:30-32; Montet-White 1968:178-179), in Missouri an affinity has been noted between the local Marshall variants and the Smith Basal Notched point, a Late Archaic type (Chapman 1975:256). The example from Miller Cave, with its very prominent barbs, is most similar to Texas variants that occur during the Late Archaic (Bell 1958:44-45).

Terminal Late Archaic/Early Woodland Points

Dyroff N=1 (figure 3-8h)

The example shown in figure 3-8h is a straight stemmed point with barbed shoulders. The base is essentially straight. The blade is triangular and slightly excurvate. It is roughly lenticular in cross section. This example measures 51.6 mm in length, 21. 6 mm wide at the shoulder, and 7.2 mm thick. It has been manufactured with random percussion flaking and the blade and base edges have been sharped by pressure flaking. The raw material is a medium grade Jefferson City chert. The Miller Cave example is closely comparable to examples from the American Bottom type site (Emerson 1984:258-266; McElrath et al. 1984:Plate 10). In the American Bottom Dyroff points are diagnostic of Prairie Lake phase (1000-600 B.C.) (McElrath et al. 1984).

Middle Woodland Points

Gibson N=1 (figure 3-9e)

The Gibson point type is described as follows: "The blade is subtriangular with convex to straight lateral edges and a round base. The maximum width is measured between the two barbs. Notching flakes are detached obliquely to the longitudinal axis from the proximal ends of the lateral edges. After notching, the base of the point retains the size and shape of the preform base; its extremities form acute angle of junction with the proximal edges of the notches" (Montet-White 1968:75). In the Illinois Valley the point is most evident between the second and fourth centuries A.D. (Ibid.:176).

The example from Miller Cave is not complete so that only one of the notches is evident and its width cannot be determined (figure 3-9e). Also. the blade has been reworked so that its original length is uncertain. As is, the piece measures 51.4 mm long and 8.4 mm thick. It is manufactured from a good quality Osagean chert. The pinkish, lustrous surface suggests heat treatment.

Late Woodland/Late Prehistoric Points

Rice Side Notched N=3 (figure 3-6a-c)

These are roughly triangular points with wide, shallow side notches. Bases are wider than the shoulders, conforming to the general definition of the type (Chapman 1981:311-12). Workmanship generally lacks refinement and symmetry, although the example shown in figure 3-6a shows retouching with pressure flaking and is made from a good quality piece of undifferentiated Ordovician chert. The example shown in 3-6b is made from relatively poor piece of Roubidoux Chert, and 3-6c from a very poor piece of Gasconade chert. Chapman notes that although the type may have appeared as early as the Late Archaic it persisted until the Late Woodland and is most characteristic of the Late Woodland period (1981:311).

	cat. no.	provenience	approx. depth below surface (cm)	identification
a	16	tr.1, sect.1, level 2	10-20	contracting stemmed point
b	83	tr.1, sect.1, level 6	50-60	contracting stemmed, hafted scraper
c	316	tr.1, sect.1, level 1	0-10	contracting stemmed point
d	240	tr.1, sect.1, level 8	60-70	Dickson-Waubesa contracting stemmed point
e	281	tr.1, sect.1, level 10	90-110	Gibson-like point

Figure 3-9. Miscellaneous points.

	cat. no.	provenience	approx. depth below surface (cm)	identification
a	264	tr.1, sect.1, level 9	80-90	Afton point
b	283	tr.1, sect.2, level 10	90-100	side-notched point
c	84	tr.1, sect.1, level 6	50-60	unfinished corner-notched point
d	242	tr.1, sect.1, level 8	70-80	unfinished point

Figure 3-10. Miscellaneous points.

Measurements for the three Rice Side Notched examples illustrated in figure 3-6 are as follows:

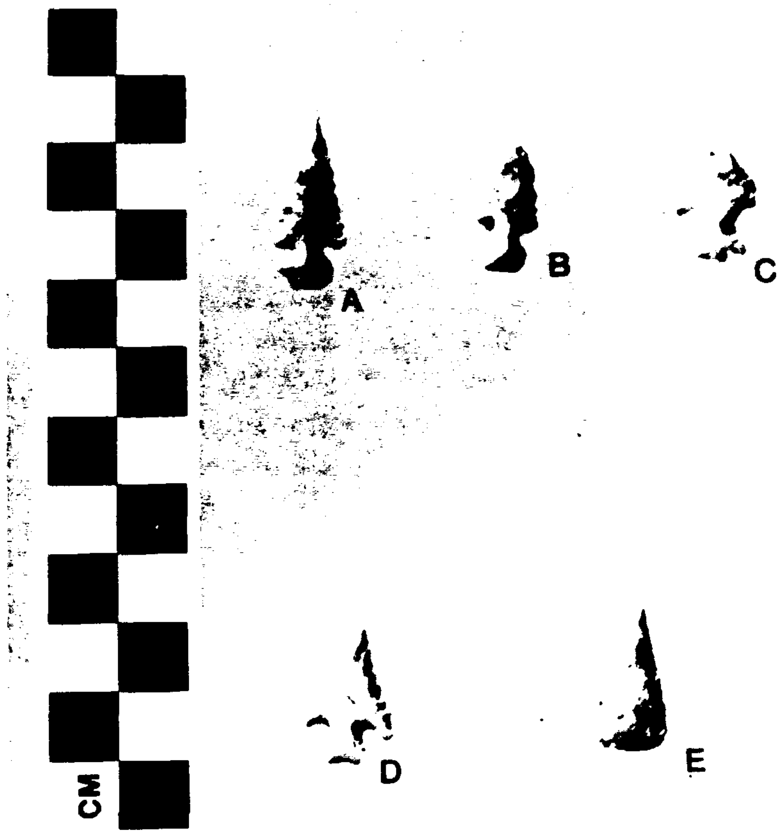
	range	*mean*
length	55-60	58.0
shoulder width	23-29	25.8
base width	24-28	26.4
neck width	21-32	25.3
thickness	7-8	7.5

Scallorn N=5 (figure 3-11a-d)

The Scallorn point is a small corner notched points with barbed shoulders. Frequently these are made from flakes. They are bifacially retouched with fine pressure flaking. Blades are occasionally serrated. There is wide variability in the notch width, resulting in either corner notched or expanding stem hafting element, depending on the width.

It has been noted that the original description of Scallorn included forms that were later segregated and defined under the name Sequoyah (Bell 1960:84; Brown 1968; Justice 1987:220-222). There is a morphological gradation between the two types making it difficult to differentiate between the them (Cf. Jolly and Roberts 1974:figures 31-32). Generally, variants that occur on the long, slender end of the continuum are more likely to be classed as Sequoyah and examples with broad blades are more likely to be labelled Scallorn. The hafting element of the Scallorn point is also likely to be broader than the Sequoyah (Cf. Justice 1987:220-224, figure 48). However, local normative examples of Scallorn points (Class CN1) are long and narrow with narrow hafting elements (Cf. McMillan 1965:90-91, figure 31; Reeder 1986:340, figure 16). Straight bases are most characteristic of Scallorn variants, whereas convex base are typical of Sequoyah points.

Locally, the Scallorn point is considered diagnostic of the Maramec Springs Phase (Marshall 1958).



	cat. no.	provenience	approx. depth below surface (cm)
a	239	tr.1, sect.1, level 8	70-80
b	265	tr.1, sect.1, level 9	80-90
c	239	tr.., sect.1, level 8	70-80
d	239	tr.1, sect.1, level 8	70-80
e	34	tr.1, sect.1, level 3	20-30

Figure 3-11. Scallorn points. a - d — Late Woodland Scallorn points; e — Scallorn-like distal fragment.

Measurements in millimeters for the Miller Cave Scallorn examples are as follows:

	N=	*range*	*mean*	*deviation*
length	4	17-22	19.6	1.9
width	5	11-14	11.7	1.2
thickness	5	3-4	3.4	0.5

Diagnostic Pottery

Except for a single Maramec Springs phase limestone tempered sherd found in Test Unit 1, all other pottery was recovered from the mixed deposits in Trench 1, Zone 1. Limestone tempered, cord marked pottery characteristic of the Maramec Springs phase predominates but Middle Woodland and Late Prehistoric types are also evident. The Trench 1, Zone 1 pottery assemblage is discussed in detail below in the discussion of that provenience.

SITE STRUCTURE

Mixed Deposits: Trench 1, Zone 1

The stratigraphy of Trench 1 consists of three zones marked by clear changes in soil and culture content (figure 2-5). The uppermost is generally 70 to 90 cm thick and consists of a mixed fill. An open trench, which presumably was originally excavated by Fowke, runs perpendicular to Trench 1. Trench 1 cross-cuts the mounded backdirt from the original trench. Zone 1 deposits are obviously churned and are reworked. Diagnostic points dating from the Early Archaic to the Late Woodland period and ceramics were encountered down to the deepest levels of the Zone 1 stratum in Section 1 and Section 2. A .22 caliber shell was found between 10 and 20 cm below the surface and a small brick fragment at depth between 30 and 40 cm. Bone elements of Norway Rat in level 6 (50-60 cm b.s.) also represent an historic or modern intrusion (table B-5).

TABLE 3-1
Artifact Counts and Weights
Test Unit 1 and Test Unit 1, Extension

ZONE 1 (0-80 cm b.s.) sediment volume = 1.3 cu m

	count	weight gms	density ct/cu m	density wt/cu m
Chipped Stone Artifacts	8	104	6	80
Chipped Stone Debris	126	502	97	386
Pottery	1	20	1	16
Bone	420	753	323	579
Shell	541	484	416	372
TOTALS	1,096	1,863	843	1,433

ZONE 2 (80-90 cm b.s.) sediment volume = 0.1 cu m

	count	weight gms	density ct/cu m	density wt/cu m
Chipped Stone Debris	2	8	20	76
Shell	4	6	40	56
TOTALS	6	12	60	132

TABLE 3-2
Artifact Counts and Weights
Trench 1, Sections 1 and 2

sediment volume = 1.35

ZONE 1 (0-110 cm b.s.) adjusted sediment volume* = 0.41

	count	weight gms	density ct/cu m	density wt/cu m
Chipped Stone Artifacts	202	2839	493	6,924
Chipped Stone Debris	768	4353	1,873	10,617
Ground Stone Artifacts	4	197	10	480
Hematite	1	9	2	22
Pottery	178	1481	434	3,612
Bone	2514	6630	6,132	16,170
Shell	3685	5920	8,988	14,439
Historical Artifacts	2	8	5	18
TOTALS	7,354	21,435	17,937	52,282

ZONE 2 (110-140 cm b.s.) sediment volume = 0.2

	count	weight gms	density ct/cu m	density wt/cu m
Chipped Stone Artifacts	28	427	140	2,134
Chipped Stone Debris	207	1058	1,035	5,292
Bone	248	672	1,240	3,360
Shell	58	215	290	1,074
TOTALS	541	2,372	2,705	11,860

ZONE 3 (140-180 cm b.s.) sediment volume = .075

	count	weight gms	density ct/cu m	density wt/cu m
Chipped Stone Artifacts	1	13	13	177
Chipped Stone Debris	30	74	400	983
Bone	25	31	333	409
Shell	7	5	93	67
TOTALS	63	123	839	1,636

* Used in density calculations to take into account that quarter samples of materials from Section 1, levels 6-11 and section 2 levels 1-4 were analyzed.

The density and diversity of archaeological materials was quite remarkable (tables 3-1 and 3-2) considering that the area had been previously excavated. All of the various lithic, ceramic, and bone artifacts illustrated in figures 3-12 through 3-20 are from Trench 1, Zone 1, except for the single biface shown in figure 3-12c. Bone was especially plentiful in this level, as was shell (table 3-2). Many species are represented in the sample including deer, raccoon, turkey, turtle, and fish. A human vertebra and a cranial fragment and other skeletal elements were found in separate levels amidst other debris including large quantities of animal bone (Appendix B). It is obvious that Fowke was very selective in collecting materials for study. His report suggests that the focus of his effort may have been on the recovery of intact burials. He notes after shipping materials to the Smithsonian the following:

> There were left in the cavern several hundred broken flint, more than 60 mortars, probably 200 stones used as pestles, hammers, etc., and several large wagonloads of shell, bone, and broken pottery [Fowke 1922:81].

The diagnostic points and ceramics from Zone 1 indicate continuous activity in the cave during all of the major Archaic and Woodland periods of Midwest prehistory as well as during the Mississippian period. Lanceolate Early Archaic points that make up the Zone 2 assemblage also occur in the mixed deposits of Zone 1 (figure 3-4a, d-k, m, p-r). Stone Square-Stemmed examples (figure 3-8e, f) along with other weakly diagnostic examples may belong to a Middle Archaic assemblage, but can be assigned to the Late Woodland Period. The diagnostic points from Trench 1 provide strong evidence of one or several Late Archaic occupations including Rice Side-Notched (figure 3-6) and Table Rock Stemmed (figure 3-4b). Terminal Late Archaic types include a Dyroff-like point (figure 3-8h). Other stemmed Late Archaic points also appear among the Zone 1 examples (figure 3-8d, g). Some of these quite likely carry over into the Early Woodland. There are several items that are unambiguous markers of the Middle Woodland period. Most notable is a rim sherd from a Hopewell Series jar (figure 3-16), typical of what Griffin (1952:116) calls the "Hopewell Rim" with an incised cross-hatcher pattern on a slightly thickened upper rim. At the base of this ban of cross-hatcher is a single row of punctates made with a hollow reed. It is a thin ware with calcite and limestone temper. Hopewell series wares have been considered items that circulated in the long-distance trade network and which occur in relatively high frequency in mortuary contexts (Markman 1988).

	cat. no.	provenience	approx. depth below surface (cm)
a	53	tr.1, sect.1, level 4	30-40
b	55	tr.1, sect.1, level 4	30-40
c	131	Fea. 1 (t.u.1,ext.1)	30-40
d	37	tr.1, sect.1, level 3	20-30
e	77a	tr.1, sect.1, level 5	40-50
f	77b	tr.1, sect.1, level 5	40-50
g	38	tr.1, sect.1, level 3	20-30
h	55	tr.1, sect.1, level 4	30-40
i	68	tr.1, sect.1, level 5	40-50
j	56	tr.1, sect.1, level 4	30-40
k	59	tr.1, sect.1, level 5	40-50

Figure 3-12. Legend (see facing page). Miscellaneous bifaces.

Figure 3-12. Miscellaneous bifaces.

Figure 3-13. Drill. Cat. no. 350, tr.1, sec.2, level 3 (50-70 cm b.s.).

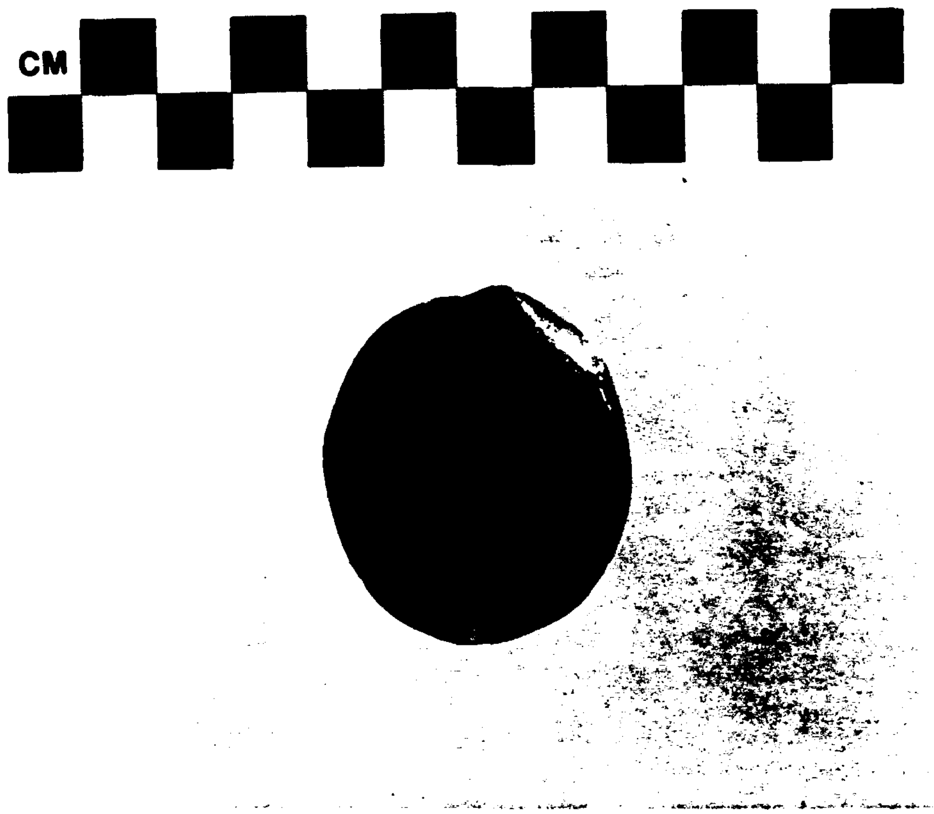


Figure 3-14. Small hammerstone or grinding stone. Cat. no. 350, tr.1, sect.1, level 4 (30-40 cm b.s.)

	cat. no.	provenience	approx. depth below surface (cm)	identification
a	41	tr.1, sect.1, level 3	20-30	scraper
b	188c	tr.1, sect.2, level 5	90-110	end and side scraper
c	188a	tr.1, sect.2, level 5	90-110	end scraper, retouched flake
d	18	tr.1, sect.1, level 2	90-110	thick biface
e	188d	tr.1, sect.2, level 5	90-110	spoke shave
f	188a	tr.1, sect.2, level 5	90-110	end scraper, retouched flake
g	41	tr.1, sect.1, level 3	20-30	scraper
h	188b	tr.1, sect.2, level 5	90-110	graver
i	41	tr.1, sect.1, level 3	20-30	scraper
j	41	tr.1, sect.1, level 3	20-30	scraper

Figure 3-15. Legend (see facing page). Miscellaneous uniface and multiface chert artifacts.

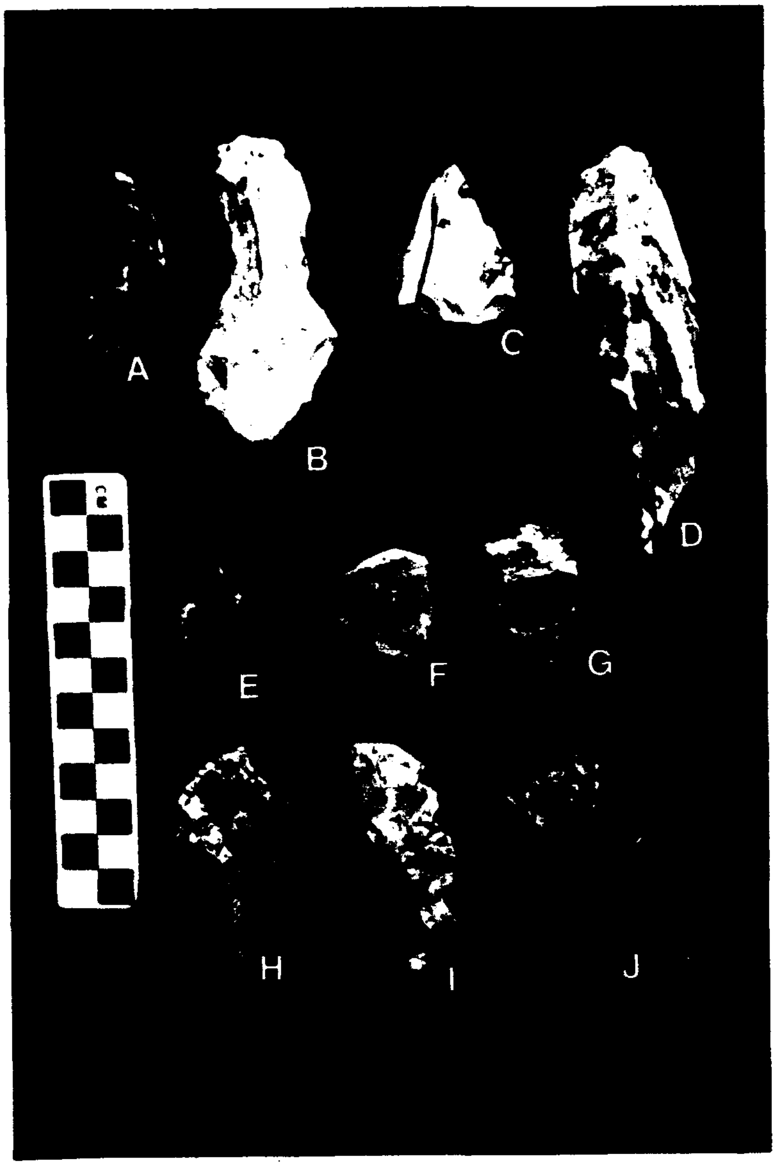


Figure 3-15. Miscellaneous uniface and multiface chert artifacts.

Figure 3-16. Middle Woodland, Hopewellian rim sherd with cross-hatcher decoration on the rim, reed punctates below the rim, and incised decoration on the body. The temper consists of calcite and limestone [Cat. no. 248, tr.1,sect.1, level 8 (70-80 cm b.s.)].

Figure 3-17. Limestone-tempered body sherd with z-twist cord-marked finish [Cat. no. 88, tr.1, sect.1, level 6 (50-60 cm b.s.)].

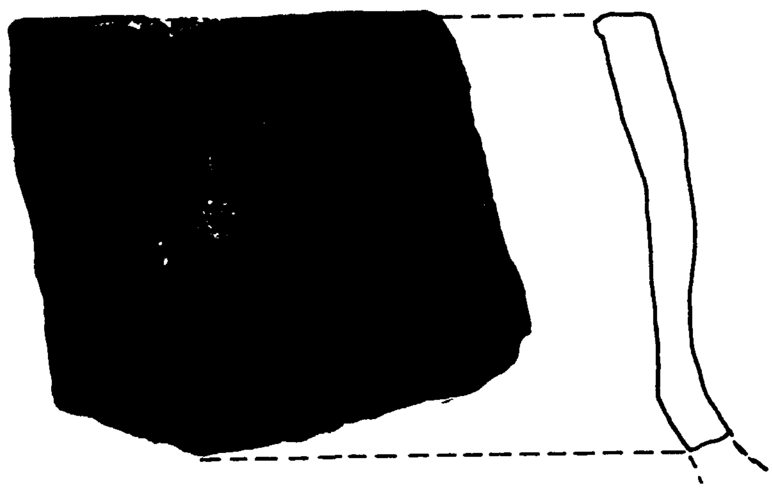


Figure 3-18. Late Woodland wide-necked jar rim with s-twist cord-marking and limestone tempering [Cat. no. 336, tr. 1, sec. 2, level 2 (40-50 cm b.s.)].

	cat. no.	provenience	approx. depth below surface (cm)	identification
a	65	tr.1, sec.1, level 5	40-50	limestone tempered, cordmarked, s-twist
b	269	tr.1, sec.1, level 9	80-90	limestone tempered, cordmarked, s-twist
c	320	tr.1, sec.2, level 1	0-10	limestone tempered, smoothed
d	66	tr.1, sec.1, level 5	40-50	limestone tempered, burnished, notched rim
e	192	tr.1, sec. 2, level 5	90-110	limestone tempered, cordmarked, s-twist
f	249	tr.1, sec.1, level 8	70-80	limestone tempered, smoothed-over-cm
g	354	tr.1, sec.2, level 3	50-70	limestone tempered, plain, pinch pot fragment
h	165	tr.1, sec.1, level 7	60-70	limestone tempered, plain & cordmarked, s-twist
i	268	tr.1, sec.1, level 9	80-90	limestone tempered, smooth

Figure 3-19. Legend (see facing page). Miscellaneous rim sherds from Trench 1, Zone 1.

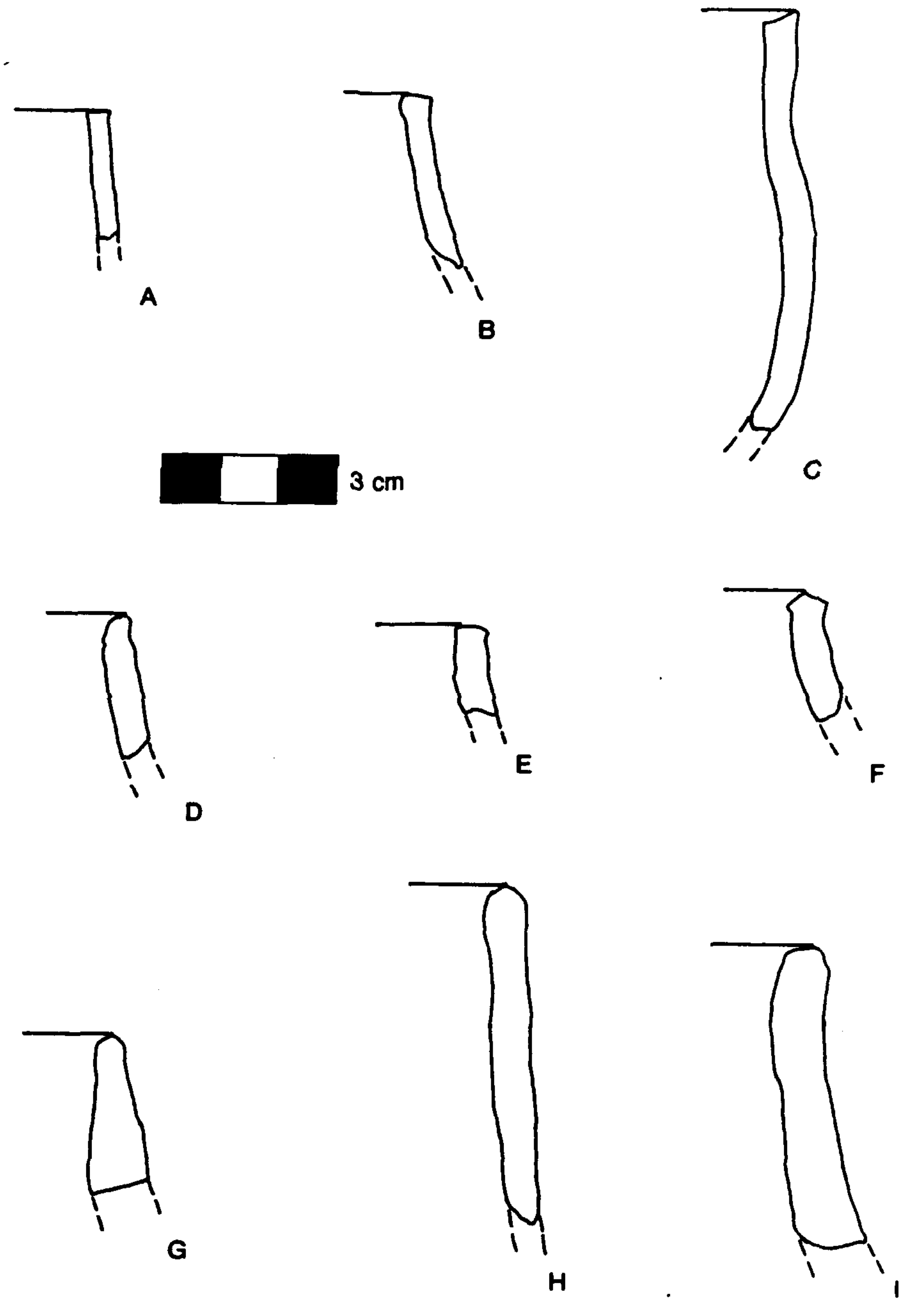


Figure 3-19. Miscellaneous rim sherds from Trench 1, Zone 1.

	cat. no.	provenience	approx. depth below surface (cm)
a	367	tr.1, sect.2, level 4	70-90
b	14	tr.1, sect.1, level 2	10-20
c	63	tr.1, sect.1, level 5	40-50
d	367	tr.1, sect.2, level 4	70-90
e	52	tr.1, sect.1, level 4	30-40
f	52	tr.1, sect.1, level 5	30-40
g	52	tr.1, sect.1, level 5	30-40
h	52	tr.1, sect.1, level 4	30-40
i	63	tr.1, sect.1, level 5	40-50
j	52	tr.1, sect.1, level 4	30-40
k	40	tr.1, sect.1, level 3	20-30
l	243	tr.1, sect.1, level 8	70-80
m	52	tr.1, sect.1, level 4	30-40
n	63	tr.1, sect.1, level 3	20-30
o	63	tr.1, sect.1, level 3	20-30
p	243	tr.1, sect.1, level 8	70-80
q	40	tr.1, sect.1, level 3	20-30
r	52	tr.1, sect.1, level 4	30-40

Figure 3-20. Legend (see facing page). Bone artifacts. a, n — deer bone awl; b-g, j-l, q, r — miscellaneous worked and/or utilized bone pieces.

Figure 3-20. Legend (see facing page). Bone artifacts. a, n — deer bone awl; b-g, j-l, q, r — miscellaneous worked and/or utilized bone pieces.

However, this example, like many others, may represent a locally manufactured rendition of a widespread type. Another example of a Hopewell Series sherd from this region is a limestone tempered fragment of Montezuma Punctate reported from Tick Creek Cave (Jolly 1981:16, figure 3b).

Lithic items belonging to the Middle Woodland assemblage include a Gibson-like point (figure 3-9d) and various contracting stemmed examples (figure 3-9a, c). It is frustrating and unfortunate that the Middle Woodland contextual information, which might have verified an association between the pottery and points, has been destroyed. Intact Middle Woodland deposits are needed to test the validity of the proposed Spring Creek Complex, an aceramic Middle Woodland (Reeder 1982), or if there is a complex Middle Woodland settlement system with functionally distinct components. If the latter is true, this would be very different from the information from the Illinois Valley where small, upland Middle Woodland sites do not seem to be distinct from the large bottomland sites, showing a fairly complete range of artifact classes, including materials that are generally considered "ceremonial" and trade items (Farnsworth and Koski 1985).

TABLE 3-3

Pottery Temper vs. Surface Treatment Crosstabulation by Count, Trench 1, Zone 1

	TEMPER						
SURFACE TREATMENT	Indet.	Lime-stone	Calcite	Shell	Grit-grog	Totals	Column pct
Indeterminate.	3					3	1.7
Plain	2	31		2	1	36	20.2
Smoothed/ Burnished		14		2		16	9.0
Cord-Marked		122				122	68.5
Incised			1			1	0.6
Totals	5	167	1	4	1	178	100
Row percent	2.8	93.8	0.6	2.2	0.6	100	

Zone 1 of Trench 1 includes numerous Maramec Springs Phase items pertaining to what must have been a substantial Late Woodland occupation. Of the 120 sherds recovered, 119 are from this stratum. The only other pottery recovered in the 1992 project was a single sherd recovered in Test Unit 1. Limestone tempered sherds make up 95.5 percent of the pottery. Of these, cordmarked wares predominate (table 3-3), comprising 67 percent of the total pottery assemblage; another 32 sherds (26.7%) are plain and another 14 (11.7%) are limestone tempered sherds that are either smoothed or burnished.

Scallorn points were found at various depths within Zone 1 (figure 3-11). Rice Side-Notched Points also appear in Zone 1 (figure 3-6). The type is claimed to be an integral part of the Maramec Spring Phase (Chapman 1980:100, 311). However, Rice Notched probably has an extended longevity, first appearing in the Late Archaic period. Likewise, drills like that shown in figure 3-12 are a characteristic artifact of the Archaic but are also included in the Maramec Spring assemblage.

It is evident that some mixing of deposits occurred in prehistory, and undoubtedly, reuse of materials also occurred. With current information, this explanation is at least as likely as any argument for extreme cultural conservatism. Much of what we know of the Maramec Springs Phase comes from shallow cave deposits where materials could easily be mixed. It must not have been unusual for the Late Woodland inhabitants of the cave to have encountered lithics from bygone periods on the surface or while digging storage or burial pits. There is no reason for them not to have realized the usefulness of these items.

In Zone 1, there are also materials that are generally considered indicative of a Mississippian period time frame including four shell-tempered sherds. Shell-tempered pottery is noted to occur in low frequency in many Maramec Spring sites. Chapman has suggested that this may indicate that the shelters such as Miller's Cave were used by different people on hunting and collecting expeditions to the region at different time periods or perhaps from different base camps, some from the Maramec Springs Phase some from the Cahokia area in the Greater St. Louis Locality (1980:106). He also suggests a temporal overlap of the Maramec Springs Phase overlapping the Mississippian period, a suggestion that could be verified by a refinement of the cultural chronology. If so, it is not necessary to hypothesize intrusions of

It seems likely that systematic attention to patterns of cord twists on the cordmarked ceramics would show that this attribute is a sensitive temporal indicator. In the American Bottom, for instance, it has been shown that there is notable shift from a predominance of s-twist cordage to z-twist cordage that marks the boundary between the Late Woodland and Emergent Mississippian periods (Hall 1980; Kelly et al. 1984:131-132). Hall has suggested that the change might be related to a switch from hand- and thigh-rolled cord to a spindle whorl system. Of the cordmarked sherds from Miller's Cave with recognizable cord twists, 12 showed z-twists and 78 s-twists (table 3-3). Figure 3-18 is a z-twist example showing a high-necked jar form characteristic of the Emergent Mississippian time frame, *circa* 1000 A.D.

Intact Deposits

Early Archaic Deposits: Trench 1, Zone 2

There is a clear break between Zone 1 and Zone 2, which is characterized by a dark clay speckled with charcoal. The density of cultural material was somewhat less than in Zone 1, but a substantial amount of bone and chert were recovered in this zone as well (table 3-2).

Zone 2 is a terminal Early Archaic stratum about 20 cm thick with a very consistent point assemblage showing a range of types that form the Tick Creek Complex including Rice Lanceolate (figure 3-3c-e, 3-4n, o), and Rice Lobed (figure 3-3a, g, 3-4b, d) examples as well as an Early Archaic Hidden Valley point (figure 3-3b, 3-8a). An unidentified corner-notched point was also found in this level (figure 3-3f, 3-5d). A radiocarbon date of 6,500 B.C., uncalibrated, or 7,500 B.C., calibrated, was derived from a charcoal sample take from this stratum.

Persimmon and grape were the only seeds identified from the flotation sample taken from Section 1. Hickory, walnut shell and acorn were also identified (Appendix C). The faunal sample shows a fairly broad spectrum of animals were exploited. Deer was the predominant source of meat, but the assemblage includes raccoon, squirrel, plains pocket gopher, turkey, soft-shell turtle, and various fish, as well (Appendix B). Mussel shell also occurs with some frequency in this level.

(Appendix C). The faunal sample shows a fairly broad spectrum of animals were exploited. Deer was the predominant source of meat, but the assemblage includes raccoon, squirrel, plains pocket gopher, turkey, soft-shell turtle, and various fish, as well (Appendix B). Mussel shell also occurs with some frequency in this level.

Late Woodland Deposits: Test Unit 1, Zone 1

Feature 1, consisting of two dog burials, was encountered in Test Unit 1 (figures 3-21 through 3-25). The two animals, one adult, Dog 1, and one juvenile, Dog 2, were placed back to back. The feature was found because the skull of the large dog, Dog 1, was visible in the wall of a pot-hunter's pit. A large biface with a reworked, graver-like tip had been placed at the haunches of the Dog 1 (figures 3-22, 3-23, and 3-12c). Fowke also noted a dog burial in the cave which he describes:

> Near the wall, just beyond the break in the slope, was the entire skeleton of a dog so old that its teeth were rounded and smooth. It had been killed by a spear thrust entirely through its body, from the right side, both scapulae being penetrated; the holes are three-fourths of an inch in diameter. The skull of a fox was found near this, higher in the ashes [1922:72].

The feature 1 dogs showed no such evidence of trauma.

The stray bones of various animals were found in the burial fill, including squirrel, beaver, rabbit, plains pocket gopher, various birds, frog, snake, sunfish, gar, and sucker and others that may represent recent denizens of the cave such as bats and mice (Appendix B, tables B-3 and B-4). An Afton and a Raddatz or Stone Square Stemmed-like point were found in the levels with the burial fill and may indicate that the burials intrude into an Archaic deposit (figure 3-25). A contracting stemmed point (figure 3-8b) and a Late Archaic/Early Woodland straight stemmed point (figure 3-8g) were also recovered in the unit. A Maramec Plain, limestone-tempered sherd found in the 10 cm level just below the burials places this feature no earlier than the Late Woodland period.

Sterile and Undated Deposits

Trench 1, Zone 3

Within Trench 1, Zone 3 was encountered in the deepest excavation at the north end, marked by the appearance of a reddish or yellowish clay level (figure 2-5). Within this soil zone, there is a sharp drop-off in artifact density. Also, digging was hampered by large pieces of roof fall. Some flakes, bone, and shell were encountered as deep as 25 to 30 cm into this zone. The lowest 20 to 30 cm were sterile. Zone 3 most likely represents a sterile stratum with materials that have migrated from above.

Test Unit 1, Zone 2

The contact between Zone 1 and Zone 2 is not clearly demarcated. Instead, there is a steady increase in clay content and drop-off in artifact density toward the bottom of Test Unit 1. A solid pavement of roof tailings was encountered at about 85 cm below surface (figure 3-21), and the bottommost 10 cm of the column was designated Zone 2, which is for the most part a sterile layer. It is quite likely that the meager lithic materials encountered here migrated downward from above. Tree roots were surprisingly plentiful in this unit and undoubtedly have created crevices for downward migration. Roots have probably worked their way into this area laterally. Although, the photographs of Leonard Blake do show a large root extending from the ceiling to the pool. No roots were encountered in the excavation of Trench 1, which is in the well-lit, main chamber, where the ceiling is 3 to 4 meters high.

Test Unit 2

Within Test Unit 2, a sterile clay, 5 to 10 cm thick, overlays a solid pavement of cobbles and boulders. This clay, or "hog-wallow mud," was extremely sticky, so much so that it was difficult to remove it from the shovel and trowel and almost impossible to screen. One might think this clay would be an excellent raw material source for manufacturing pottery except that it is subject to extreme expansion and contraction with wetting and drying.

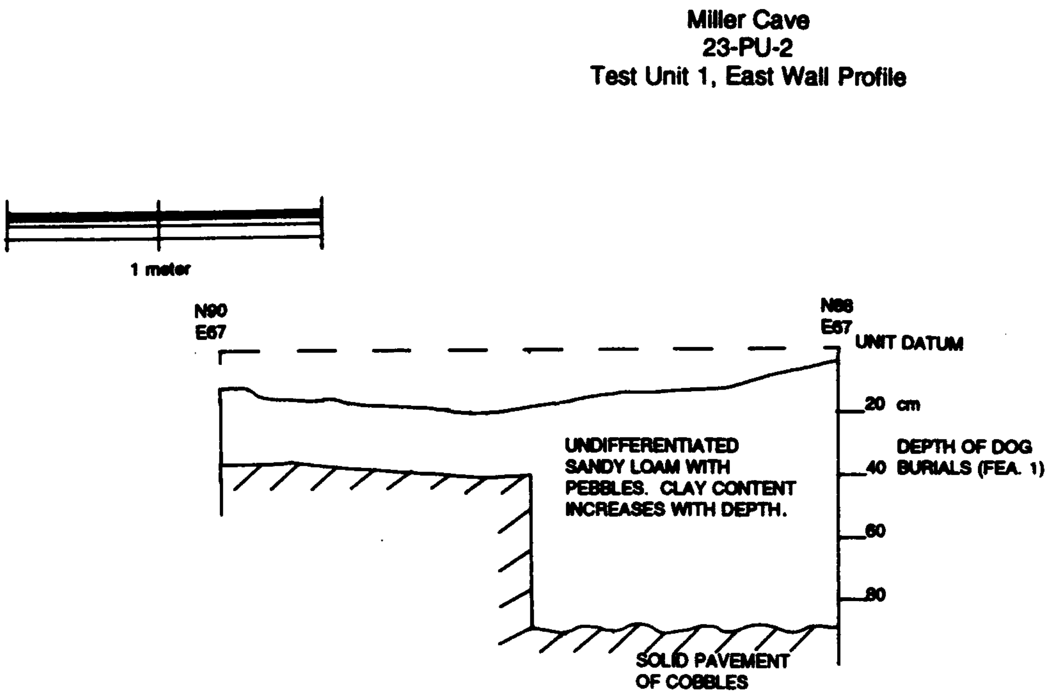


Figure 3-21. Profile showing the stratigraphy of Test Unit 1.

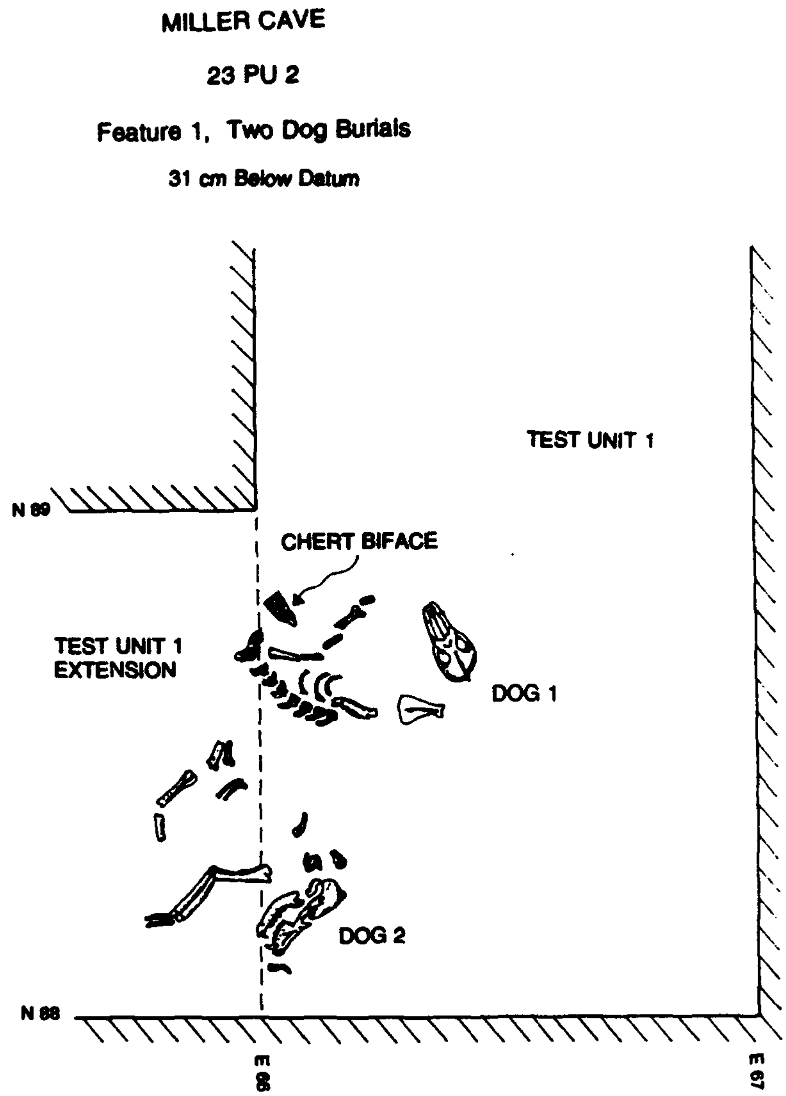


Figure 3-22. Plan view of feature 1, two dog burials.

Figure 3-23. Photographic plan view of feature 1, two dog burials (see figure 3-22). The head of Dog 1 was removed before taking the photograph. It was revealed in a vandal's pit. A chert biface can be seen by the hindquarters of Dog 1 and is also shown in figure 3-22.

Figure 3-24. A crudely made biface (cat. no. 92-131), a distal fragment, associated with Dog Burial 1 (feature 1, see figures 3-22 and 3-23). The tip has been reworked into a graver.

	cat. no.	provenience		approx. depth below surface (cm)
a	117	t.u.1, level	4	30-40
b	97	t.u.1, level	2	0-10

Figure 3-25. a — Afton Corner Notched; b — Raddatz-like side-notched Archaic point.

DISCUSSION

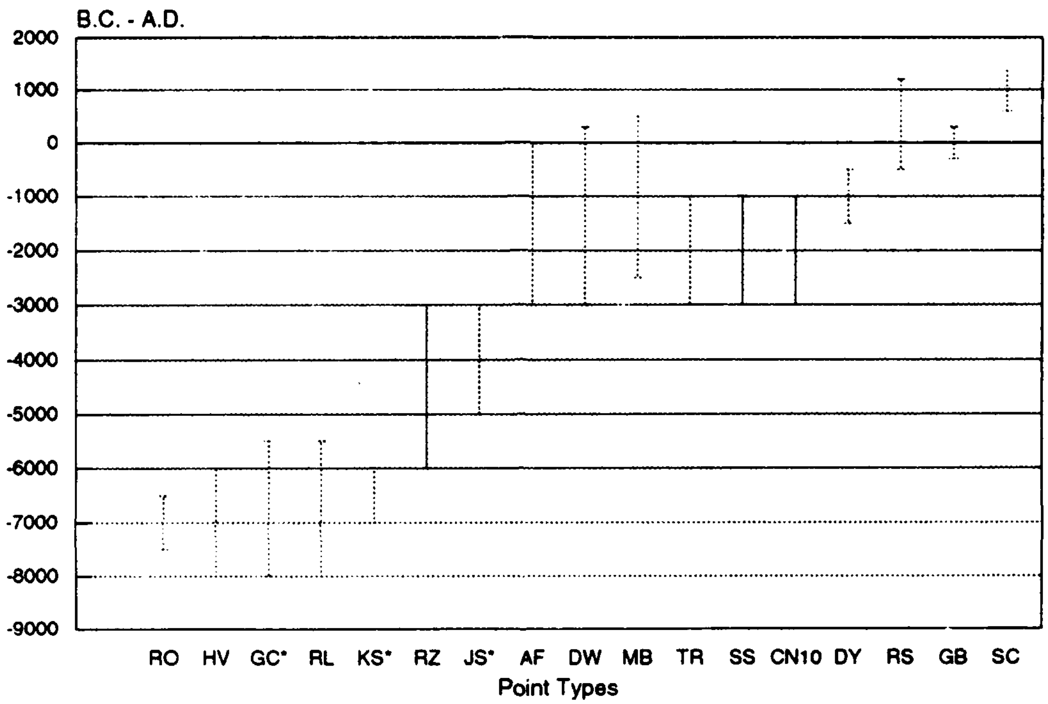
The Phase II testing at Miller Cave has provided a solid radiocarbon date and good subsistence data, contributing to our knowledge of the prehistory of Central Ozarks where these types of data are meager. Furthermore, the deposits have yielded and are likely to yield important information expanding current knowledge of prehistory with regard to a number of topics relating to the prehistory of the Central Ozarks including: (1) local cultural chronology; (2) prehistoric subsistence; (3) economies of lithic raw material use and tool production; (4) patterns of settlement and mobility; as well as (5) regional interaction. This work confirms that the site meets the criteria for National Register eligibility. It is only unfortunate that the potential of the cave to yield new information on prehistoric mortuary practices — beyond what Fowke provides in his report (1922) — seems to have been largely exhausted prior to the inception of the present study.

Diagnostic materials show that the site was occupied, or at least visited, during all of the major periods of prehistory from Early Archaic through Late Woodland (Figure 3-26). Prior to recent disturbances the cave may have provided insight into several episodes of prehistory. At present the data allow for expanded interpretation of only two periods: the Early Archaic and the Late Woodland.

It is likely that site function during the Early Archaic occupation and the Late Woodland occupation were quite different. While the cave may have been a generalized habitation site or encampment in the Late Archaic, it seems likely that during the Late Woodland it served as a component of a more complex settlement system, namely a locus where specialized mortuary and ritual functions occurred. At least for part of the Maramec Springs occupation, the cave was a mortuary site, probably related to a large village site (23PU4), represented by the earthworks and other remains described by Fowke on the terrace lowlands across the river (Fowke 1922:58-59).

General features of the mortuary program presented to us by Fowke's account show a local conformity to a widespread Late Woodland pattern characterized (1) much variation in the disposition of the dead within a single mortuary site, and (2) the placement of burials in mounds and rock cairns, generally on river bluffs, or in

Miller Cave Diagnostic Points



* Illustrated by Fowke (1922) but not recovered in 1992 project.

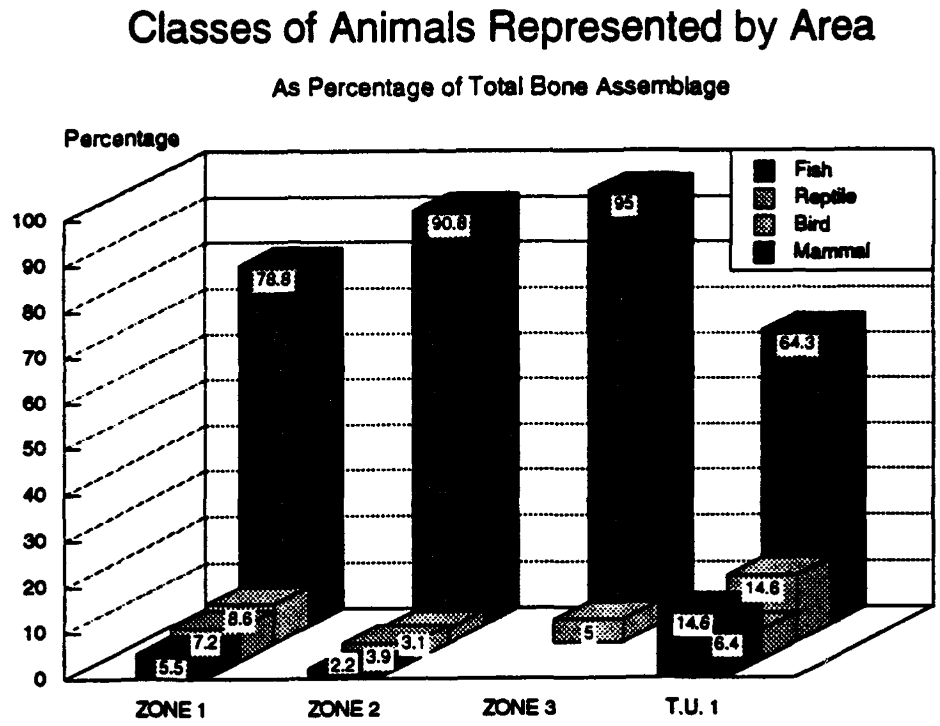
Abbreviations

RO	-	Rice Lobed	RZ	-	Raddatz	CN10	-	Class CN10
HV	-	Hidden Valley Stemmed	JS	-	Jakie Stemmed	SS	-	Stone Square Stemmed
GC	-	Graham Cave Notched	AF	-	Afton	DY	-	Dyroff
RL	-	Rice Lanceolate	DW	-	Dickson Waubesa	RS	-	Rice Side-Notched
KS	-	Kirk Serrated	MB	-	Marshall Barbed	GB	-	Gibson
			TR	-	Table Rock Stemmed	SC	-	Scallorn

cave sites. Late Woodland burial sites in the Midwest are usually separate from but in the vicinity of semi-permanent villages and temporary encampments (Cf. Muller 1986:134, Hurley 1975:7ff). Reeder summarizes the Gasconade drainage data noting that mortuary loci include both caves and cairns and that no burials have been found at open habitation sites (1988:282). He also notes that up to 45 percent of the larger caves and rock shelters in the region may contain Late Woodland burials and approximately two-thirds of the cairns and mounds with datable materials can be shown to be Late Woodland (Ibid.). What determined the choice of cave or a cairn for burial remains an unanswered question (Cf. Niquette 1986). Frequently cairns are found near caves and rock shelters (Cf. Niquette et al. 1983; Markman and Baumann 1993). Indeed, numerous cairns have been found on the ridge above Miller Cave. Further discussion of the Miller Cave burials and general Late Woodland mortuary practices is included later in this chapter.

In addition to mortuary ritual, other ritual activities also must have occurred at Miller Cave, as indicated by the dog burials revealed in Test Unit 1. Also, the petroglyphs, although difficult to date, probably correspond to the Late Woodland occupation and the site's specialized function. Although interpretations of these depictions must fall within the realm of speculation, it may not be far-fetched to suggest that the repeated element described by Fowke (1922) as a "bar passing though an opening" is a depiction of sexual union and a shorthand symbol of fertility. From the perspective of premodern hunter-collectors or farmers, fertility and the bounty of nature — or lack of bounty — must have been a central source of concern and something to try and affect through symbolic manipulation.

While the cave might have served special function, it would be a mistake to assume a neat compartmentalization of activities. Mortuary and other ritual activity in many premodern societies involves feasting, which archaeologically would appear as evidence of "subsistence activity." That is, it probably would not be possible to distinguish the refuse resulting from daily subsistence activities from the refuse resulting from ritual feasting. Either way, the stray animal bones included in the dog burial fill may reflect patterns of Late Woodland subsistence. At least, information regarding long-term trends in subsistence patterns seems to be corroborated in a comparison of the bone assemblage from Test Unit 1 and the Early Archaic assemblage from Zone 2 of Trench 1 (figure 3-27). The Late Woodland assemblage



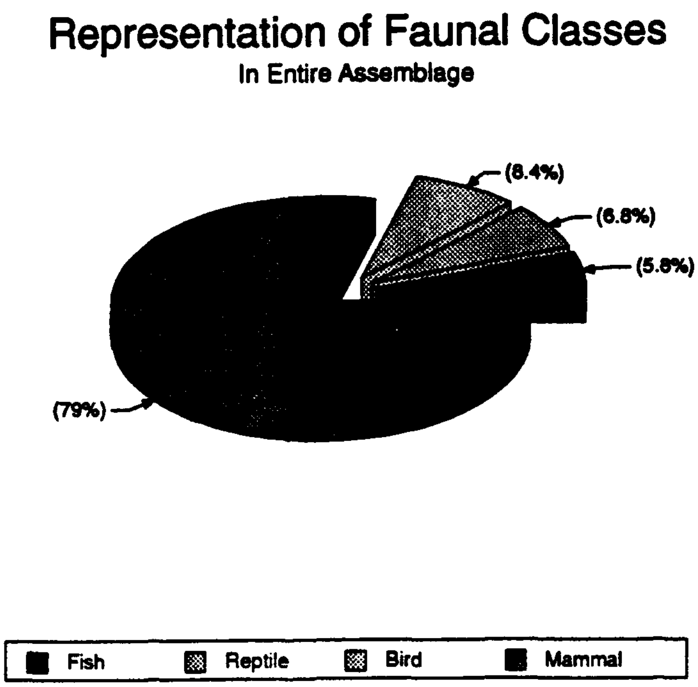


Figure 3-27. Composition of faunal assemblage.

shows a more balanced diversity of animals utilized. Furthermore, the contrast evident in figure 3-27 between Test Unit 1 and Trench 1, Zone 2 would be even more pronounced if the elements of the two articulated dog skeletons were not included in the samples. While the Early Archaic assemblages seem to be more skewed toward high meat-yield species — deer and perhaps turkey — both assemblages include a wide range of terrestrial and aquatic species of all sizes (Appendix B).

No carbonized seeds were found in the flotation sample from Test Unit 1. Usually, Late Woodland kitchen deposits include an array of starchy seeds and occasionally deposits that post-date A.D. 800 might include corn (D. Asch and N. Asch 1985:199). Noncarbonized but mineralized hackberry seeds were identified and given the context — far in the back of a cave — these were probably materials that were transported into the cave and do not represent natural seed rain (Appendix C). The assemblage included various nut shell fragments as did the Early Archaic sample from Trench 1. The Early Archaic sample also included wild grape and persimmon, which would have grown in the flood plain forest. These seeds suggests a late summer and fall occupation. Additional data might provide firmer grounding for assessing the seasonal occupation. And these data might contribute in the future to our overall understanding of the regional settlement system if additional Early Archaic sites are excavated. The potential for obtaining seasonality data from occupations that followed the Early Archaic is extremely limited because of the severe mixing of the overlying deposits in the main chamber.

It is unfortunate that there are questions about the cave that will never be answered because of the destruction and loss of context that has occurred in recent and historic times. However, further insight into prehistoric subsistence in the central Ozark and the chronology of the mortuary component of the site might still be obtained from the skeletal materials being stored at the Smithsonian Institution. It seems possible — to judge from the meager data provided by Fowke (see Appendix D) — that the burials may represent a span of time in which corn was incorporated into the diet and carbon isotopic analysis combined with radiocarbon dating of bone collagen may provide a sequence of assays that document this transition.

Only three of the skeletons reported by Fowke had associated artifacts. The first of these is described as "The folded skeleton of a very old person" that "lay on the

right side, head east, in loose ashes on a large flat rock whose top was 30 inches below the surface. . . Lying above the skull, in contact with it but supported by the ashes on both sides, was a half of a large mortar hollowed on both sides" (Fowke 1922:67). A second skeleton is described as "a partial skeleton lying on the back. The right arm, folded lay by the side; the left forearm across the pelvis. All bones from the atlas to the sacrum, except some bones of the hands and wrists and the left ulna lay in such position as to show they had been interred with the flesh on, or at least the cartilages held them together; but no trace of the skull — which had laid toward the west — or of any part of the legs or feet was present. Fragments of coarse cloth were adhering to the pelvis. The bones, which were almost like punk, were those of a young person, the caps of the long bones being separate from the shaft." (Ibid.:69-70). The third burial with associated artifacts was the partial skeleton of an infant found below other scattered human skeletal remains. Fowke notes "five shell disk beads among the bones; the only instance which ornaments were found with human bones" (1922:71). The shell disk bead would seem to place this burial within a in a Mississippian time frame. However, further work should help be . define and distinguish Late Maramec Spring assemblages and clarify the nature of the relationships and interactions between groups in the Central Ozarks and contemporary village dwelling agriculturalists of the Mississippi Valley to the east, the Missouri Valley to the north, and the Arkansas Valley to the south.

The disposition and association of these 3 burials and an additional 14 that Fowke reports (1922) are summarized in Appendix D. In addition, he reports numerous instances of stray human bones being encountered in the excavation. In most instances the burials seem to conform to what Wood (1967) has termed "broadcast burials". Such broadcast burials, or scattered secondary, burned, and unburned inhumations seem to be the predominant type found in local cairns (Niquette 1986). Niquette, summarizing excavation data from cairns in this region notes that burnt bones characteristically show fracture patterns indicating they were burnt after the flesh was gone and the bones had dried (Ibid.:14). The local cairns frequently include bundled and flexed burials — in addition to the broadcast burials — suggesting interment while the bones were still fleshed.

A review of prehistoric mortuary uses of caves covering much of the Midwest and Southeast shows that such variation in burial disposition within a single cairn or

cave is part of a widespread Late Woodland pattern (Cf. Haskins 1988). Some of burials described by Fowke generally conform to the summary description of Maramec Springs burials offered by Carl Chapman:

> Funerary customs included burials in primary extended or semiflexed positions in holes or under rocks in shelters and caves. A good example is Priest Cave . .. Burial goods consisted of large fragments of pottery vessels, arrowheads, mortars, and tool kits placed under the shoulder at the side, near the head, or at the feet (1981:105).

Similarities are also evident with the Late Woodland Boone phase of central Missouri north of the Gasconade Basin, where burials in a single mound frequently include a variety of types including (1) primary flexed or semiflexed; (2) primary, fully extended, supine; (3) skulls not associated with other bones; (4) cremations, in separate piles; (5) bundle burials or bunched masses of disarticulated bones; or (6) scatterings of burned or unburned bones often mixed with burned earth and charcoal (Ibid.: 112). Investigation of rock cairns on the Fort Leonard Wood reservation also revealed similar variability within single cairns, although most had been looted leaving mostly the "scatter burial" remains (Niquette 1986).

The variation in the stages of decomposition of the burials suggests group burial was practiced at intervals of several years, the bones of the dead being saved, perhaps in a charnel structure or some other facility, where the flesh would decompose during the interim (Cf. Brown 1979, Chapman 1981:115-116). Fowke provides a less likely speculation on the origin of "scattered burials":

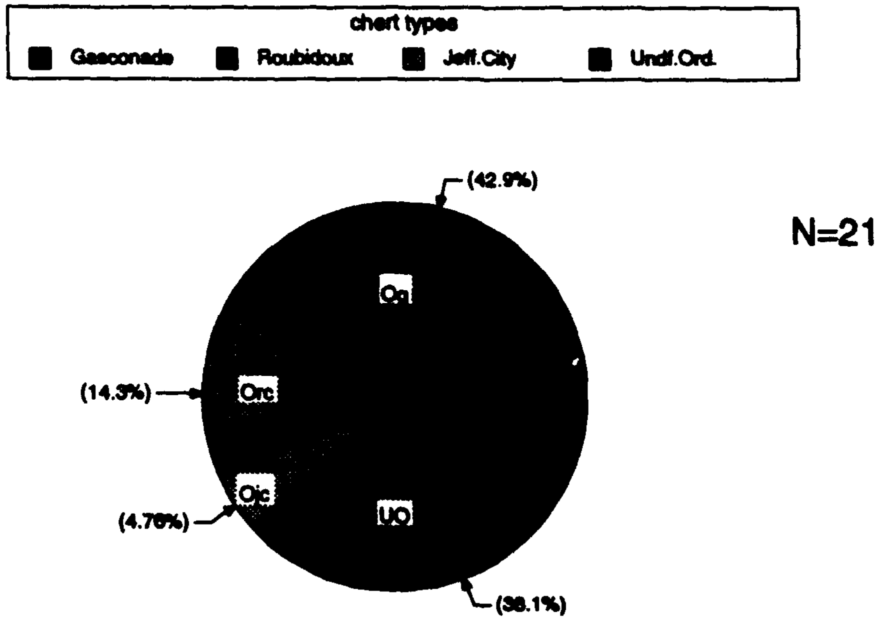
> These fragments were all in such position and condition as to show they were not carried by animals; were not disinterred from graves and placed here; were not in any way accidentally present; but had been gathered up with the refuse and thrown in as part of it. The broken or burned condition of these, as well as other human bones found at random among the ashes of the main cave, are presumptive evidence that dwellers here sometimes devoured the flesh of human beings; and the fact that a majority of such bones are those of children indicates that it was not eaten through a belief that the valor and skill of an enemy could be thus absorbed by the victor, but that it was used as food, like the flesh of any other animal. Such conclusion may not be justified; but the facts are not readily accounted for otherwise, except on the equally repulsive hypothesis that the inmates of the cave were brutally indifferent to the bodies or skeletal remains of their fellows (Fowke 1922:76-77).

Ethnohistoric records for the Eastern United states show that periodic burial of stored corpses was practiced at widespread locations at time of European contact, and periodic, communal burial is one possible explanation of the various modes of skeletal disposition that might be encountered at a single burial site. The Huron Feast of the Dead, documented by the explorer Champlain, is perhaps the best known account of periodic, communal burial practices (Heidenreich 1978:374). Every 8 to 12 years all single burials would be disinterred and prepared for final disposition in a communal grave. Also, the sixteenth century watercolor painting of John White provides a depiction of a southeastern charnel house along with an annotation describing the characteristic procedure for removing the flesh and drying the bones of collected corpses (Lorant 1946:217, 269). In the Midwest similar practices of periodic, communal burial have their origin at least as early as the Middle Woodland period (Cf. Brown 1979). Charnel houses and crypts were used for temporary storage where bodies would decompose before finally being covered over with mounds. It has been suggested that Late Woodland cairns probably represent a scaled-down continuation of Middle Woodland moundbuilding and mortuary ceremonialism (Chapman 1981:117).

Of course, the stray bones that Fowke found mixed with refuse do not necessarily represent "scatter burials" or the result of periodic, communal burial practices. At least some of these scattered bones must have been burials that had been disturbed by the prehistoric inhabitants while digging storage pits, hearths, and even new burial pits. Excavations in Merrell Cave show that caves were used for burial as early as the Early Archaic (McMillan 1965), implying the possibility of a very long term accumulation of skeletal material. It may be that any digging by late prehistoric occupants of the cave would have resulted in the disturbance of long forgotten graves. Unfortunately, the context which would clarified the issue has been destroyed as Zone 1 of the main cave has been thoroughly reworked by Fowke and others. This destruction also severely limits the potential of this site for yielding new information on Late Woodland mortuary practices.

The lithic assemblage recovered from Miller Cave indicates a great deal of continuity over the long span of local prehistory with regard to patterns of chert utilization. Namely, non-local and exotic cherts are virtually absent and no orthoquartzite was found. All of the assemblages show a strong propensity to utilize the abundant, locally-available Ordovician cherts (table A-2; figures 3-28 and 3-29).

TRENCH 1, ZONE 2 FORMAL TOOLS
Chert Raw Material Composition



TRENCH 1, ZONE 2 DEBRIS
Chert Raw Material Composition

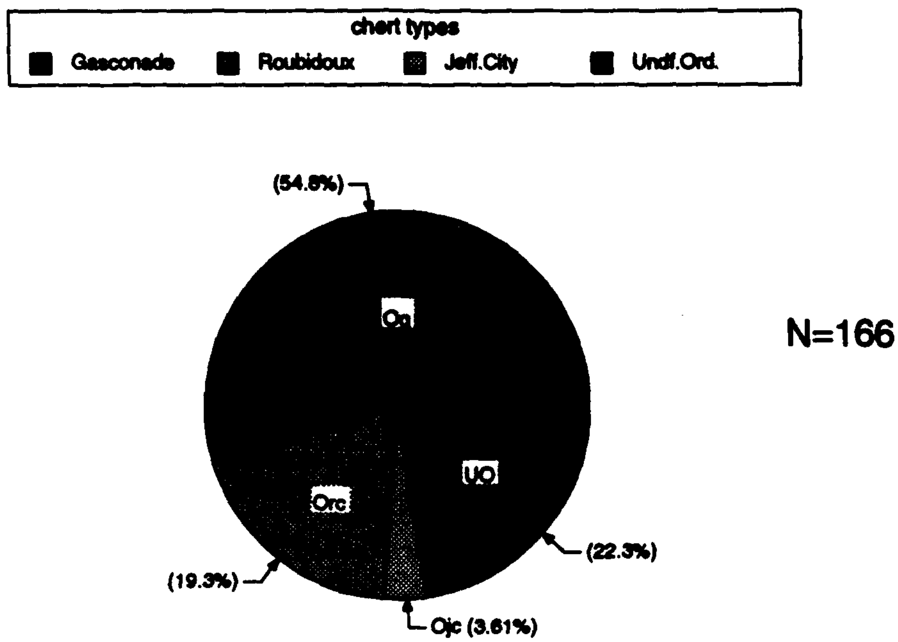
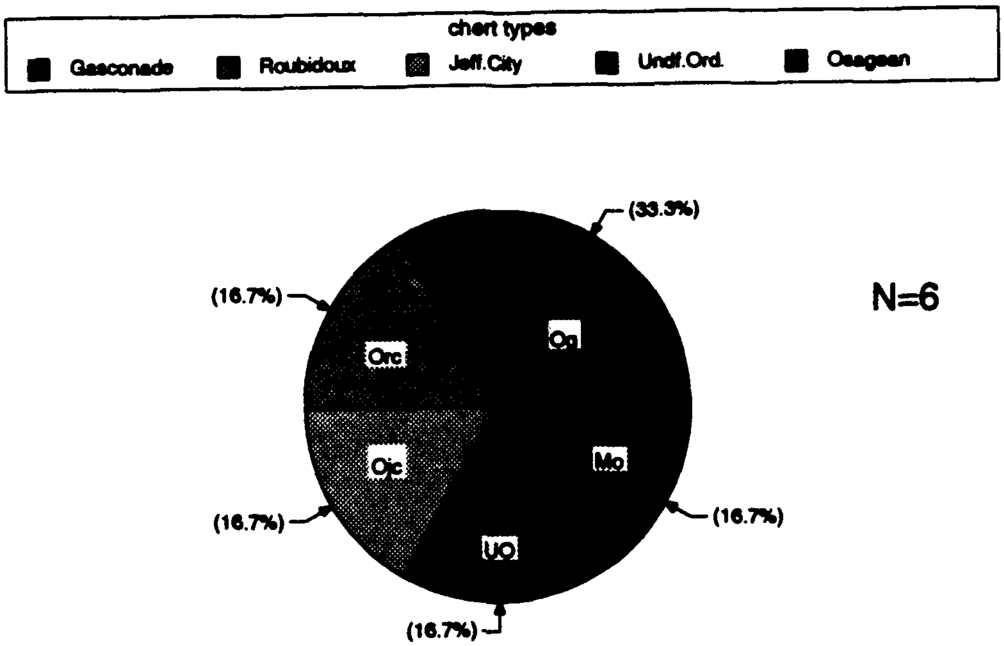


Figure 3-28. Early Archaic assemblage chert raw material composition. (see Appendix A, Table B-2).

TEST UNIT 1 FORMAL TOOLS
Chert Raw Material Composition



TEST UNIT 1 DEBRIS
Chert Raw Material Composition

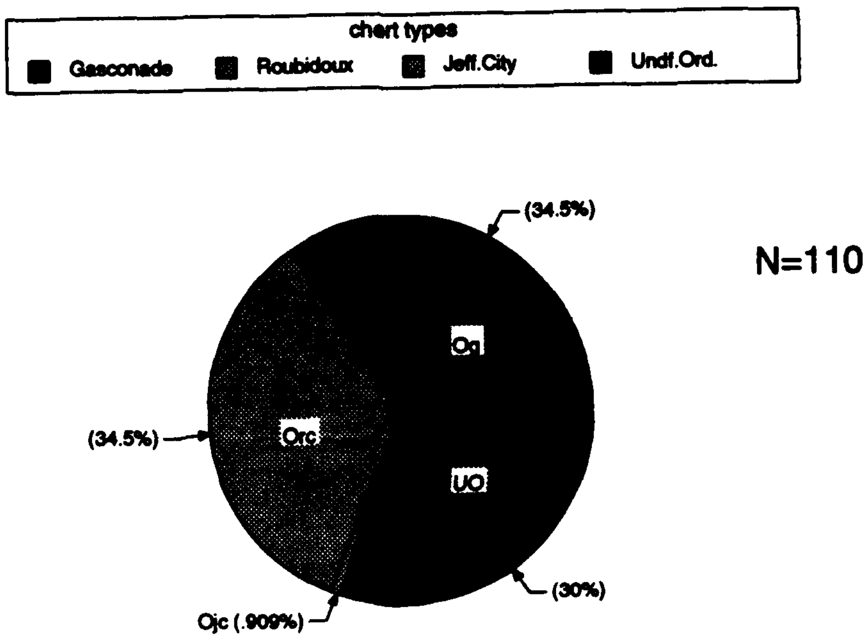


Figure 3-29. Test Unit 1 chert raw material composition (see Appendix 1, Table B-2).

Of the 303 items listed in table A-2 only one is from a non-local chert, a square stemmed Late Archaic/Early Woodland point of Osagean chert (figure 3-8g). It has been shown that when hunter gatherers utilize abundantly available (i.e. inexpensive) lithic raw materials, it can be expected that economizing strategies will not be implemented for artifact manufacture, use, and discard (Jeski 1989). But as raw materials become expensive strategies for efficiently utilizing raw materials will be used including standardization in artifact form and extension in tool use-life, as well as reduction in tool size. Correlates that can be expected with expensive raw material use would include a relatively low frequency primary flakes and other early-stage reduction debris as well as a relatively high frequency of blades and the spent polyhedral cores from which blades are manufactured. Although blades can only be used briefly before the must be discarded, blade technologies represent an extremely efficient means of obtaining a maximum amount of cutting edge from a fixed quantity of raw material (Reid 1976). Another economizing strategy is to favor tools that can be maintained for long periods, retaining their usefulness by reworking. A relatively high frequency of bifaces and other formal tools should correlate with the presence of expensive (i.e. exotic and non-local) raw materials. As might be expected, given the virtual absence of expensive raw materials, flakes and other manufacturing debris are abundant in the Miller Cave assemblage and formal tools occur in low frequency (Table A-1), suggesting that many task may have been conducted with "expedient" tools — tools that are easily manufactured and readily discarded, such as utilized flakes. Although few utilized flakes were identified with gross examination methods, the count might increase with microscopic examination. Micro-wear studies were beyond the scope of the present project but might be implemented in the future to further investigate this proposal. However, there are other data that suggest the presence of what has been called an "expedient" lithic strategy (Jeski 1989). A very salient feature of the Miller Cave assemblage is the complete absence of blades or polyhedral cores. The lack of blades seems to be consistent with a widespread pattern found in the Ozarks and with what might be expected in a region where usable chert is ubiquitous. For instance, a 1992 survey in the southwestern corner of Fort Leonard Wood provide a sample of 787 chipped stone artifacts, none of which were blades or polyhedral cores (Markman and Baumann 1993). Likewise, a survey of 45 cave sites in southwestern Missouri yielded a total of 1,144 chipped stone artifacts, none of which were blades (Ray and Benn 1989:Appendix B).

The contrast between the chipped stone assemblages of Test Unit 1, Zone 1 and Trench 1, Zone 2 might be used to interpret the difference in the Early Archaic and Late Woodland economies of raw material use, but there are intervening variables that make the comparison difficult. The function and activities conducted at the darkened back of the cave in the Late Woodland period were probably not the types of daily functions that occurred in the front of the cave in the Early Archaic. Furthermore, the burial fill for the Late Woodland dog burials in Test Unit 1 included debris from earlier occupations. The Early Archaic represented by Trench 1, Zone 2 includes a high proportion of formal tools — 11.9 percent — as compared to 3.1 percent of the Test Unit 1, Zone 1 assemblage. The Miller Cave data suggest the there may have been a greater emphasis during the Late Woodland as compared to the Early Archaic period on the use of "expedient" tools. The difference in the raw use indicated by these two proveniences — Test Unit 1, Zone 1 and Trench 1, Zone 2 — does not seem to be significant, especially when comparing debris categories (figures 5-28 and 5-29). A comparison of formal tools is difficult because of the small sample size from Test Unit 1. Generally, Gasconade, Roubidoux, and Undifferentiated Ordovician classes predominate within both samples, with Jefferson City chert occurring in low frequency (figure 5-28 and 5-29; table A-2).

Table A-1 indicates that formal tools comprise 10.9 percent of the chipped stone assemblage of Trench 1, Zone 1, a mixed deposit. However, the formal tools were picked out and counted before quartering the sample. Thus, the figure of 10.9 percent should be reduced by a factor of 4 to an adjusted 2.7 percent. Yet we are still left with an imprecise knowledge of the bias of Fowke's collection technique and how this would have effected the composition of the assemblage that remained in the cave. Fowke probably removed a higher proportion of formal tools that debris, but how much higher remains unknown. His report suggests that manufacturing debris would be very under-represented in the shipment that went back to Washington, while bone, antler, and shell artifacts and human skeletal remains would be highly over-represented:

> "Without attempting to make a detailed list, there may be given a summary of the objects shipped to the National Museum:
>
> 12 skulls, most of them more or less broken.
> 10 partial skeletons, including those of children.

8 fragments of skulls from different individuals not included in the above.
74 objects of shell
711 worked flint objects; knives, scrapers, cores, etc.
10 grooved axes, tomahawks, and flint hammers.
10 mortars.
40 pestles, stone hammers, rubbing stones, etc.
413 wrought objects of bone and stag horn.
2 clay pipes.
1 box of pottery fragments.
A number of small objects, not classified.

"There were left in the cavern several hundred broken flints; more than 60 mortars; probably 200 stones used as pestles, hammers, etc., and several large wagonloads of shell, bone and broken pottery" (Fowke 1922:81).

It seems that the collectors who followed Fowke focussed heavily on the ground stone items and left behind the lithic, shell, bone, and pottery fragments.

Currently a total of only 748 Miller Cave items are listed in the Smithsonian catalogs — catalog numbers 310605 through 310721 — suggesting the possibility that some items may have been lost or "de-accessioned" over the years. A very brief perusal of the drawers containing the collection was made around 1990 and it seemed to confirm the suspicion that a great deal of selectivity may have been implemented to acquire "museum quality" items, or perhaps, that the collection may have been "upgraded" since delivered by Fowke by getting rid of items that lacked immediate visual appeal (Valerie Haskins, personal communication, October 1992).

CHAPTER 4

RECOMMENDATIONS

The 1992 investigations at Miller Cave show that while most of the upper level prehistoric deposits were disturbed by Fowke's early excavations and by subsequent vandalism, there still are intact deposits that have yielded and have the potential to yield important information to shed light on the prehistory of the region; measures should be taken to either intensify the level of protection or mitigate further damage by conducting data recovery.

The Fowke trenches and backdirt deposits exceed fifty years in age and it might be argued that they constitute significant cultural resource in themselves with potential for yielding important historical information on the early development of American Archaeology. However, this potential is very limited, although the history of investigations in the cave is interesting.

RECOMMENDATION CRITERIA

The management of cultural resources is predicated on recommendations formulated on the basis of criteria established for nomination of properties to the National Register of Historic Places. These criteria state that [(23CFR60): National Register of Historic Places 41(28), February 10, 1974, p 5907]:

> The quality of significance in American history, architecture, archaeology, and culture are present in districts, sites, buildings, structures, and objects of the state and local importance that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and;
>
> a) That are associated with events that have made a significant contribution to the broad patterns of our history, or;

b) That are associated with the lives of persons significant in our past, or;

c) That embody distinctive characteristics of a type, period, or method of construction, or that represent the work of a master or, that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction, or;

d) That have yielded, or may be likely to yield information important in history or prehistory.

Because of the idiosyncratic nature of each resource, somewhat fluid interpretations of these criteria are necessary. Where this is the case, the judgement and professional experience of the investigator become factors in formulation of recommendations.

DISCUSSION OF SIGNIFICANCE

Miller Cave is significant according to criterium "d" above, and nomination to the National Register of Historic places is being submitted on this basis.

Within the Gasconade Study Unit, the refinement of cultural chronology should be a high priority objective as proposed by Christopher Wright (1987) in his Master Plan summary of existing archaeological knowledge. A refinement of the existing cultural chronology is necessary to address numerous questions regarding the sequence of cultural development in the Central Ozarks and the relationship between this area and neighboring areas of the Midwest and Southeast. Characterization of the Ozarks in prehistory as culturally isolated, conservative, and marginal, have little empirical foundation, as do the recent challenges to these characterizations.

The 1992 investigations at Miller Cave show that the cave still possesses intact, datable deposits that can contribute to our knowledge of at least two periods in the prehistory of the region, the Early Archaic and the Late Woodland. These deposits have yielded faunal, floral, and artifact remains. A radiocarbon assay of 8500 ± 180 B.P. was obtained for wood charcoal associated with a level that included an assemblage of points from the early Tick Creek Complex -- Rice Lanceolate, Agate Basin, Rice Lobed -- and is the first radiometric date for this complex.

Paleoethnobotanical and bone remains were recovered in the same stratum. Also, two dog burials and other remains in close association provide insight in to the diet and ritual patterns of the Late Woodland, Maramec Springs Phase.

DISCUSSION OF IMPACT

The main source of impact to the archaeological deposits at the cave comes from casual digging by recreational visitors including personnel from the Ft. Leonard Wood Army base. Some protection has been provided including warning signs and surveillance by the base game wardens. However, the current level of surveillance is obviously insufficient, and with budgetary cut-backs, it is likely that there will be a reduction in game-control staff.

SPECIFIC RECOMMENDATIONS

If it is not possible to increase the level of surveillance, it is recommended that a Phase III data recovery be conducted that would included the following.

1. More extensive excavations to recover data from intact deposits beneath Zone 1 in the main chamber and to recover distributional information on materials in these deposits that can be used to identify activities and activity areas.

2. More extensive excavation of the deposits in the back of the cave.

3. Detailed reporting on the materials at the Smithsonian Institution, relating these materials to those recovered in the recent investigations at Miller Cave.

4. Bone collagen dates for selected skeletal samples at the Smithsonian and assays to assess C_4 pathway data for evidence of corn in diet and to provide corroborative information with the ethnobotanical data from Miller Cave and other Late Woodland sites such as Feeler (23MS12).

5. Physical anthropological assessment of the skeletal information for indicators of stress and starvation -- coupled with the faunal and floral indicators of diet -- to further explore question of Ozark environmental marginality.

6. Significant information could be derived by obtaining additional assays from intact deposits and should be included as part of a Phase III data recovery.

APPENDIX A

CHIPPED STONE SUMMARY STATISTICS

Table A-1

Chipped Stone Tool and Debris Tabulation

	Trench 1, Zone 1*		Trench 1, Zone 2		Trench 1, Zone 3		T.U. 1, Zone 1		T.U. 1, Zone 2	
	Grams	Count	Grams	Count	Grams	Count	Grams	Count	Grams	Count
Diag. prjctl point	541.2	49	77.6	8	-	-	54.7	4	-	-
Nondiag. prjctl pt	91.4	10	-	-	-	-	-	-	-	-
Thin biface	904.4	86	238.6	15	13.3	1	49.4	4	-	-
Thick biface	804.2	21	61.1	2	-	-	-	-	-	-
Preform	88.5	3	-	-	-	-	-	-	-	-
Sub-total weight	2,429.7(22.8%)		377.3(26.1%)		13.3(15.0%)		104.1(14.7%)		-	
Sub-total count		169(9.1%)		25(10.6%)		1(3.1%)		8(4.9%)		-
Uniface	12.1	2	-	-	-	-	-	-	-	-
Drill	15.5	4	-	-	-	-	-	-	-	-
Perforator	7.6	2	-	-	-	-	-	-	-	-
Spokeshave	8.4	1	16.4	2	-	-	-	-	-	-
Scraper	320.0	20	33.1	1	-	-	-	-	-	-
Graver	45.0	4	-	-	-	-	-	-	-	-
Knife	4.0	1	-	-	-	-	-	-	-	-
										-
Sub-total weight	412.6(3.9%)		49.5(3.4%)		-		-		-	
Sub-total count		34(1.8%)		3(1.3%)		-		-		-
Percussion flake	1,040.0	109	300.9	17	13.2	2	8.6	5	-	-
Thinning flake	877.9	247	304.4	76	30.3	12	103.0	40	1.3	1
Sharpening flake	1.0	3	.6	3	.2	1	2.8	9	-	-
Broken flake	810.3	313	215.3	92	24.6	13	159.2	86	-	-
Other flake debris	3,403.8	875	-	-	1.4	1	-	-	-	
Sub-total weight	6,077.7(57.1%)		821.2(56.8%)		69.7(78.8%)		273.6(38.7%)		1.3(17.1%)	
Sub-total count		1,543(83.4%)		188(80.0%)		29(90.6%)		140(85.9%)		1(50.%)
Utilized/retouched flakes	92.4(.9%)	8(.4%)	-	-	-	-	-	-	-	-
Angular Shatter	705.1	86	115.2	17	5.4	2	136.0	14	6.3	1
Core	918.4	10	81.9	2	-	-	193.1	1	-	-
Sub-total weight	1,623.5(15.3%)		197.1(13.6%)		5.4(6.1%)		329.1(46.6%)		6.3(82.9%)	
Sub-total count		96(5.2%)		19(8.1%)		2(6.3%)		15(9.2%)		1(50.0%)
SUBT FORMAL TOOL WT	2,842.3(26.7%)		426.8(29.5%)		13.3(15.0%)		104.1(14.7%)		-	
SUBTTL FORMAL TOOL CT		203(11.0%)		28(11.9%)		1(3.1%)		8(4.9%)		-
SUB-TOTAL DEBRIS CT	7,701.2(72.4%)		1,018.3(70.5%)		75.1(85.0%)		602.7(85.3%)		7.6(100.0%)	
SUB-TOTAL DEBRIS WT		1,639(88.6%)		207(88.1%)		31(96.9%)		155(95.1%)		2(100%)
GRAN TOTAL LITHIC WT	10,635.9		1,445.1		88.4		706.8		7.6	
GRAN TOTAL LITHIC CT		1,850		235		32		163		2

* Formal tools are over-represented because they were picked out before the sample was quartered.

TABLE A-2*
Lithic Raw Material Source Indentifications

	Local				Non-Local	
	Og	Orc	Ojc	UO	Mo	Totals
TRENCH 1, ZONE 2						
Formal Tc 's	9	3	1	8		21
Debris	91	32	6	37		166
Formal Tools (row %)	43	14	5	38		100
Debris (row %)	55	19	4	22		100
TEST UNIT 1						
Formal Tools	2	1	1	1	1	6
Debris	38	38	1	33		110
Formal Tools (row %)	33	17	17	17	17	100
Debris (row %)	35	35	1	30	0	100

* see figures 3-28 and 3-29

APPENDIX B

FAUNAL REMAINS

by

William T. Whitehead
and
Lucretia Kelly

The purpose of faunal analysis in archaeology is twofold, to interpret human exploitation of animal resources in a given environment and generate indirect evidence in determining the quality of that environment. Miller Cave provides a unique opportunity to determine the human interaction with other animals in the Archaic time period by identifying, quantifying, and interpreting the animal bone present. Bone preservation in Miller Cave is excellent; however, the impact of modern human disturbances makes interpreting the assemblage problematic because of the significant loss of temporal and spatial provenience. The loss of context limits the quality of interpretations that can be made, but broad patterns of faunal exploitation should be reliable.

Faunal materials from Trench 1, Section 1, Levels 1-9 (Zone 1) were analyzed by William Whitehead (table B-1) with emphasis placed on the identification of mammalian and avian bone. The analysis consisted of identifying the species, body part, portion and side of body part, level of burning, identification of cut marks, possible human tool use, age of animals present, presence of animal gnawing, and the number and weight of bones present. All tables give the NISP (Number of Identifiable Specimens Present) by species and provenience. The MNI (Minimum Number of Individuals present) were calculated by level, taking age, size, and NISP data into consideration for each species.

Lucretia Kelly analyzed the following: Trench 1, Section 2, Zones 2 and 3 (table B-1); Test Unit 1 (table B-2); Feature 1, the dog burials 1-2 (table B-3); and bones in flotation samples from Test Unit 1, Level 3 and Trench 1, Section 1, Level 12 (table B-4). Kelly's Identification focused on species presence, NISP by species, and MNI calculations using the above stated method.

Turtle, mussels, fish, snail and other reptile bones present are not focused on, but will be used in comparing the quantities of mammalian and avian bone present.

In conducting the analysis, level bags were first sorted by animal class, then by element within class, and finally by species. The categories of initial sorting are fish, mammal, avian, turtle, other reptile, snail, and mussel. Within these class categories bones of similar element are grouped. Several broad categories are used for elements of unknown origin but with similar characteristics. They are long bone shaft, axial fragment, and unidentifiable and possibly identifiable fragments. Bones of similar type are bagged together by provenience with identification cards listing analysis results inserted in the bags.

Previous literature on the patterns of faunal exploitation on the Gasconade River is sparse; one important reference is Reeder's dissertation (1988). He characterizes the Early, Middle, and Late Archaic subsistence patterns as broad based, utilizing most terrestrial mammal, avian, reptile, and amphibian species and starting in the Middle Archaic with use of aquatic resources.

The faunal assemblage data given in tables B-1 through B-5 are summarized in figure 3-25. Mammal remains from all four major zones (Zones 1, and 3 of Trench 1 and Zone 1 of Unit 1) are the most abundant, with avian, reptile, and fish remains in decreasing abundance. This pattern is consistent with most interpretations of faunal remains from the Archaic periods, emphasizing heavy dependence on terrestrial mammal species, especially white-tailed deer (*Odocoileus virginianus*). Deer specimens outnumber and outweigh the identified faunal assemblage from every major zone.

Besides deer, other mammals species present are Raccoon (*Procyon lotor*), Squirrel (*Sciurus* sp.), Plain Pocket Gopher (*Geomys bursarius*), mice and rats

(Cricetidea), Bats (Vespertillonidae), Dogs and Coyotes (*Canis familiaris/latrans*), Beaver (*Castor canadensis*), Eastern Cottontail Rabbit (*Sylivilagus floridanus*), Vole (*Microtus* sp.), Elk (*Elaphus elaphus*), River Otter (*Lutra canadensis*), Woodchuck (*Marmota monax*), Stripped Skunk (*Mephitis mephitis*), Norway Rat (*Rattus rattus*), Field Mouse (*Peromys* sp.), Spotted Skunk (*Spilogale putorius*), and Red Fox (*Vulpes vulpes*).

The following species present show that hunting techniques were not limited to mammal hunting but included appropriate traps or snares to catch more difficult flying prey: Terrestrial avian species (Wild Turkey, *Meleagris gallopavo*; Bobwhite, *Colinus virginianus*; Pheasant, *Phasianus colchicus*; and Prairie Chicken, *Tymphanuchus cupido)*, and other bird species [Teal (*Anas discors/crecca*), Coot, (*Fulica americana*), Great Horned Owl (*Bubo virginianus*), Screech Owl (*Otus asio*) Grebes (Colymbidae), Hawks (Accipitridea), Perching birds (Passeriformes), and Doves and Pigeons (Columbiformes)]. The amount of avian remains is not great and makes up no more than 3.1 to 14.6 percent of the total faunal assemblage.

Turtle (both soft-shell, and land turtle) carapace, plasitron, and limb elements are present in all zones but Zone 3 and make up no more than 7.2 to 3.9 percent of the total faunal assemblage. Snake (Serpentes) vertebrae, and frog limb elements are also found but are represented by only 23 bone fragments.

Fish are present in all zones except Zone 3 -- which may be a factor of differential preservation and recovery -- and like the avian and turtle remains are poorly represented (2.2 to 14.6 %) in comparison to mammal remains. The taxa present are Gar (*Lepisosteus* sp.), Small-Mouth Buffalo (*Ictiobus bubalus*), Red Horse (*Moxostoma* sp.), Channel Catfish (*Ictalurus punctatus*), Suckers (Catostomidae), Sunfish (Centrarchidae), and Minnow (Cyprinidae). All of these species are found in the streams and rivers in Pulaski County. Larger river and wetland species such as Drum, Paddlefish, and Large-Mouth Bass are absent.

Mussel shell and snail shell are well represented in the faunal assemblage. Either of these species can be eaten and their shells used for tools or ornamentation. Since identification of the mussel and land snail shell was not performed, the significance of these species to the diet cannot be safely estimated. However, from

the amount of shell present (3.25 kg. from Trench 1, Section 1, Levels 1-9), these species could have played an important part in the diet of prehistoric people because of their predictable location annually, relatively high yield of meat per energy outlay, and nutrient content (i.e., protein, fat, minerals, and vitamins).

In summary, the faunal assemblage shows that most every available food resource was utilized by Miller Cave inhabitants. At least 40 different species of mammal, bird, reptile, fish, amphibian, mussel, and snail are present in the total faunal assemblage. Figure 3-25 shows the total makeup of the entire assemblage by major taxonomic category. Mammal remains are the predominant component of the assemblage (79% by NISP) with Bird (8.4%), Reptile (6.8%), and Fish (5.8%) making up the remaining 21 percent.

TABLE B-1
Early Archaic Faunal Assemblage

	Trench 1, Section 2	
	Zone 2	Zone 3
Mammals		
Procyon lotor (Raccoon)	1 (1)	
Sciurus sp. (Squirrel)	3 (1)	
cf. *Geomys bursarius* (Plains Pocket Gopher)	1 (1)	
Cricetidae (Mice and Rats)		1 (1)
Odocoileus virginianus (White Tailed Deer)	135 (2)	6 (2)
Large Mammal	32	5
Medium-Large Mammal	31	4
Medium Mammal	4	1
Small-Medium Mammal		
Small Mammal		2
Total Mammal	207 (5)	19 (3)
Birds		
Meleagris gallopavo (Turkey)	2 (1)	1 (1)
Large Bird	4	
Medium Bird	1	
Total Bird	7 (1)	1 (1)

Table B-1. Early Archaic Faunal Assemblage, continued.

	Trench 1, Section 2	
	Zone 2	Zone 3
Bird or Mammal	19	
Reptiles		
Trionyx sp. (Soft-shell turtle)	1 (1)	
Indeterminate turtle	8	
Total Reptile	9 (1)	
Fish		
Lepisosteus sp. (Gar)	1 (1)	
Ictiobus bubalus (Small-Mouth buffalo)	1 (1)	
Moxostoma sp. (Red horse)	1 (1)	
Indeterminate Fish	2	
Total Fish	5 (3)	
Invertebrates		
Gastropod (snail)	15	
Pelecypod (mussels)	5	
Total Invertebrates	20	

TABLE B-2
Test Unit 1 Faunal Assemblage

	Test Unit 1				
	Lvl 5	Lvl 6	Lvl 7	Lvl 8	Lvl 9
Mammals					
Vespertillonidae (Bats)	1 (1)				
Canis sp. (Dog/Coyote)	1 (1)	1 (1)	1 (1)		
Sciurus sp. (Squirrel)		1 (1)			
Cricetidae (Mice and Rats)	2 (1)				
Odocoileus virginianus (White-tailed Deer)	21 (1)	3 (1)		11 (1)	1 (1)
Large Mammal	9				3
Medium -large Mammal		6			
Medium Mammal		2	2	3	
Small- Medium Mammal	1				
Total Mammal	35 (4)	13 (3)	3 (1)	14 (1)	4 (1)
Birds					
cf. *Anas discors/crecca* (teal)	1 (1)				
cf. Accipitridae (Hawk)		1 (1)			
cf. Strigidae (owl)			1 (1)		
Colinus virginianus (Bobwhite)	1 (1)				
Large Bird	1				
Medium-large bird		3	1		
Medium bird	6		3	1	

Table B-2. Test Unit 1 Faunal Remains, continued.

	Test Unit 1 Lvl 5	Lvl 6	Lvl 7	Lvl 8	Lvl 9
Small-medium bird	1				
Small bird	1				
Indeterminate bird				3	
Total Bird	11 (2)	4 (1)	5 (1)	4 (1)	
Bird or Mammal		3			
Reptiles					
Trionyx sp. (soft shell turtle)	1 (1)				
Indeterminate turtle	1			1	
Total Reptile	2 (1)			1	
Fish					
Ictalurus punctatus (Channel catfish)	1 (1)				
Total Fish	1 (1)				

TABLE B-3
Feature 1: Dog Burials and Associated Faunal Remains

	Dog 1	Dog 2
Mammal		
Canis familiaris (dog)	416 (1)	205 (1)
Sciurus sp. (squirrel)	2 (1)	1 (1)
cf. *Geomys bursarius* (Plains pocket gopher)		1 (1)
Castor canadensis (Beaver)	1 (1)	
Cricetidae (Mice and Rats)	3 (1)	4 (1)
Sylivilagus floridanus (Eastern cottontail)		1 (1)
Odocoileus virginianus (white-tailed deer)	12 (1)	8 (1)
Large-Medium mammal	506	400
Medium mammal		1
Small mammal	1	1
Total Mammal	941 (5)	622 (6)
Birds		
cf. Colymbidae (Grebe)	1 (1)	
cf. *Fulica americana* (Coot)	1 (1)	
Passeriforme (Perching birds)	1 (1)	
Large-Medium bird	1	
Indeterminate bird	1	
Total Bird	5 (3)	
Bird or Mammal		1

Table B-3. Dog Burials and Associated Faunal Remains, continued.

	Dog 1	Dog 2
Reptile		
Indeterminate turtle	3	
Indeterminate snake	1	
Total Reptile	4	
Amphibian		
Rana/Bufo (frog/toad)		1 (1)
Total Amphibian		1 (1)
Fish		
Lepisosteus sp. (Gar)	1 (1)	
Catostomidae (suckers)	1 (1)	1 (1)
Centrarchidae (sunfish)		1 (1)
Indeterminate Fish		2
Total Fish	2 (2)	4 (2)
Indeterminate Vertebrate	10	
Invertebrates		
Gastropod (snail)	3	26
Pelecypod (mussels)	1	7
Total Invertebrates	4	33

TABLE B-4
Faunal Material from Flotation Samples

	TU1,Level 3		Tr.1, Sec.1 Level 12	
	>1/4"	<1/4"	>1/4"	<1/4"
Mammal				
Vespertillonidae (Bats)		2 (1)		2 (1)
Sciurus sp. (squirrel)	1 (1)		2 (1)	6 (1)
Geomys/Sylvilagus (Gopher or Rabbit)		3 (1)		3 (1)
Cricetidae (Mice and Rats)		6 (1)		1 (-)
Microtus sp. (vole)		1 (1)		2 (1)
Odocoileus virginianus (White-tailed Deer)			2 (1)	
Large Mammal	3		12	
Medium-Large Mammal	22		16	
Medium Mammal	1			
Small-Medium Mammal		2		15
Small Mammal				
Total Mammal	27 (1)	14 (4)	32 (2)	29 (4)
Bird				
Passeriforme (Perching Bird)		1 (1)		1 (1)
Medium Bird				1
Small Bird				1
Total Bird		1 (1)		3 (1)
Bird or Mammal	1		38	

Table B-4. Faunal Materials from Flotation Samples, continued.

	TU1,Level 3		Tr.1, Sec.1 Level 12	
	>1/4"	<1/4"	>1/4"	<1/4"
Reptiles				
Indeterminate turtle	2	1		
Indeterminate snake		5	1	2
Total Reptile	2	6	1	2
Amphipian				
Rana/Buto (Frog/Toad)	1	2		2
Fish				
Lepisosteus sp. (Gar)		1 (1)		1 (1)
Cyprinidae (Minnows)		1 (1)		
Catostomidae (Suckers)		5 (2)	1 (1)	
Moxostoma sp. (Red Horse)				4 (1)
Centrarchidae (Sunfish)				2 (1)
Indeterminate Fish	1	16	1	15
Total Fish	1	23 (4)	2 (1)	22 (3)
Invertebrates				
Gastropod (Snail)	4	43		138
Polecypod (Mussels)	4		12	
Total Invertebrates	8	43	12	138

TABLE B-5
TRENCH 1, ZONE 1 FAUNAL SAMPLES

	1	2	3	4	5	6	7	8	9	Total
Mammal										
Elaphus elaphus (Elk)			1 (1)		3 (1)	1 (1)		2 (2)	1 (1)	8 (6)
Canis familaris (Common dog)			1 (1)					1 (1)		2 (2)
Carnivore (meat eater)					2 (1)					2 (2)
Castor canadensis (Beaver)			1 (1)		1 (1)			1 (1)		3 (3)
Geomys bursarius (Plains Pocket Gopher)					5 (2)	2 (2)	4 (2)	1 (1)		12 (7)
Lutra canadensis (River Otter)			1 (1)							1 (1)
Marmota monax (Woodchuck)					2 (1)	1 (1)				3 (2)
Mephitis mephitis (Stripped Skunk)				1 (1)						1 (1)
Odocoileus virginianus (White Tailed Deer)	8 (1)	11 (2)	31 (2)	53 (3)	107 (3)	42 (2)	50 (2)	31 (2)	16 (2)	349 (19)
Rattus rattus (Norway rat)						1 (1)				1 (1)
Rodent (Mouse or Rat)	7 (1)		5 (1)	1 (1)	7 (1)	4 (1)	4 (1)	1 (1)		29 (7)
Peromys sp. (Field Mouse)						1 (1)				1 (1)
Procyon lotor (Racoon)	1 (1)			2 (1)	1 (1)			1 (1)	1 (1)	6 (5)
Sciurus sp. (Squirell)	1 (1)	3 (1)		1 (1)	17 (4)	3 (1)	1 (1)			26 (9)
Spilogale putorius (Spotted Skunk)									1 (1)	1 (1)
Sylvilagus floridanus (Eastern Cottontail)		1 (1)	6 (2)	1 (1)	4 (1)	1 (1)				13 (6)
Vulpes vulpes (Red Fox)					4 (4)		1 (1)			5 (5
Large Mammal		72	78	60	23			56	23	312
Medium Mammal	6	11	36	2	7	4	8	13	8	95

Table B-5. Trench 1, Zone 1 Faunal Samples, continued.

	1	2	3	4	5	6	7	8	9	Total
Small Mammal						1		2	1	4
Indeterminate Mammal	61	18	26	26	274	111	93	22	6	637
Total Mammals	84 (4)	116 (4)	186 (9)	147 (8)	457 (17)	170 (9)	165 (7)	131 (7)	57 (5)	1513 (70)
Birds										
Bubo virginianus (Great Horned Owl)							1 (1)			1 (1)
Colinus virginianus (Bobwhite Quail)			1 (1)							1 (1)
Columbiformes (Doves and Pigeons)				1 (1)						1 (1)
Meleagris gallapavo (Wild Turkey)		1 (1)	1 (1)	1 (1)	5 (3)	3 (1)				11 (7)
Otus asio (Screech Owl)						1 (1)				1 (1)
Phasianus colchicus (Ring-necked Pheasant)							1 (1)			1 (1)
Tympanuchus cupido (Prairie Chicken)			1 (1)	1 (1)						2 (2)
Indeterminate Bird	11 (1)	16 (1)	15 (1)	21 (1)	50 (1)	13 (1)	12 (1)	3 (1)	9 (1)	150 (9)
Total Bird	11 (1)	17 (1)	18 (1)	24 (1)	55 (1)	17 (3)	13 (2)	3 (1)	9 (1)	168 (22)
Reptiles										
Indeterminate Turtle	5 (1)	1 (1)	9 (1)	17 (1)	47 (1)	15 (1)	15 (1)	18 (1)	10 (1)	137 (9)
Indeterminate Snake	1 (1)				3 (1)					4 (1)
Fish										
Lepisosteus sp. (Gar)			1 (1)					1 (1)		2 (2)
Indeterminate Fish	10 (1)	8 (1)	12 (1)	5 (1)	27 (1)	8 (1)	5 (1)	4 (1)	4 (1)	83 (9)
Total Fish	10 (1)	8 (1)	13 (2)	5 (1)	27 (1)	8 (1)	5 (1)	5 (2)	4 (1)	85 (11)

Table B-5. Trench 1, Zone 1 Faunal Samples, continued.

	1	2	3	4	5	6	7	8	9	Total
Invertebrates (Given in grams)										
Snails		22	10	20	24	4	10	3	7	100
Mussels	288.1	423	304.4	373.7	640.7	207.7	232.2	384.4	299	3153.2g
Homo sapiens (Humans)				2 (1)	1 (1)		3 (1)		3 (1)	9 (1) or (4)

APPENDIX C

FLORAL REMAINS

by

Patti Jo Wright

Two flotation samples were submitted for paleoethnobotanical analysis. These include one 7-liter sample from Trench 1, Section 1, Zone 2, and one 8-liter sample from Test Unit 1, Level 3. Both samples were measured *in situ* and, as a double check, they were also bucket-measured just prior to flotation. A SMAP-like flotation device was used to cleanse and separate the samples into light and heavy fractions. Following a period of air drying, the light and heavy fractions were size-sorted through U.S.A. Standard Testing Sieves with 6.3 mm, 2.0 mm, and 0.5 mm brass mesh. Items larger than 2.0 mm were completely sorted. The resulting macrobotanical remains were counted and weighed with a Fisher Series 7000 electronic balance with capabilities to 0.01 g. Items smaller than 2.0 mm were scanned for seeds and other plant debris not observed in the respective larger than 2.0 mm fraction. If the latter were discovered, they were recorded on a present/absent basis. Regarding wood analysis, a subsample of 10 fragments was randomly chosen from each heavy and light fraction. Hence, 20 fragments per float were analyzed.

The results of this analysis are given in Tables C-1 and C-2. These samples show little in the way of carbonized food remains; the majority of charcoal is from wood. The species of wood identified are White Oak (12 specimens of 40 analyzed), Red Oak (3 specimens of 40), Hickory (7 of 40 specimens), and Red Cedar (5 of 40 specimens). These species make up the majority of trees in the Pulaski County area characterized as the Oak/Hickory association in the well-drained river and stream valleys with cedar growing on the steep, thin soiled slopes of the upland bluffs.

Food remains include nutshell (hickory, acorn, and walnut), fruit seeds (persimmon, and grape seed), a wild legume cotyledon, and hackberry (*Celtis*) seed coats. It should be noted that the *Celtis* seed coats -- listed in Table C-1 -- are not carbonized but may very well date back to the prehistoric occupation of the cave. These seed coats are made of calcium carbonate and may survive in sediments for hundreds or thousands of years. Given that the remains occur in the cave and no other uncarbonized plant material are present in the samples, it is evident they have been transported.

Grass stems and bark were also found but in low numbers.

Table C-1
Results of Float Sample Analysis: Seed & Nutshell

Type of Remain	Trench 1, Section 1, Zone 2			Test Unit 1, Level 3		
	>2.00 mm	>0.5 mm	<0.5 mm	>2.00 mm	>0.5 mm	<0.5 mm
Light Fraction						
Wood	29 1.12 g	p	p	555 6.33 g	p	p
Bark	2 0.02 g			5 0.5 g		
Vitis sp. (grape pip whole)	1					
Juglandaceae Nutshell (Walnut family)		p		3 0.06 g	p	
Carya spp. nutshell (Hickory)				4 0.08 g		
Quercus sp. nutshell (Acorns)		p		3 0.01 g	p	
cf. Fabaceae (Legume seed)		1				
Poaceae (Grass family stem fragments)				2 0.01 g		
Heavy Fraction						
Wood	327 3.69 g	p		29 0.62 g	p	p
Bark	5 0.13 g					
Carya spp. (Hickory nutshell)	180 3.45 g			10 0.19 g		
Juglans nigra (Black Walnut shell)	23 0.65 g					
Quercus spp. (Acorn shell)	2 0.02 g	p				
Juglandaceae (Walnut Family nutshell)	71 1.35 g	p		12 0.08 g	p	
Celtis spp. (Hackberry seed coats)				42 2.43 g		
cf. *Diospyros virginiana* (Persimmon seed coat)		1				

Table C-2
Results of Wood Charcoal Analysis

Taxa	Trench 1 Section 1 Zone 2		Test Unit 1 Level 3	
Light Fraction	**Count**	**Wt.**	**Count**	**Wt.**
Quercus Leucobalanus (White Oak Group)	4	0.15 g	3	0.19 g
Quercus Erythrobalanus (Red Oak Group)	2	0.07 g		
Carya sp. (Hickory)	1	0.05 g	1	0.05 g
Querus sp.	3	0.02 g	1	0.01 g
Juniperus virginia (Red Cedar)			5	0.40 g
Heavy Fraction				
Quercus Leucobalanus (White Oak Group)	2	0.05 g	3	0.06 g
Quercus Erythrobalanus (Red Oak Group)			1	0.04 g
Carya sp. (Hickory)	4	0.11 g	1	0.01 g
Ring Porous	2	0.01 g	2	0.08 g
Semi-ring porous			1	--
Knotwood	1	0.04 g		
Unidentified	1	0.01 g		

APPENDIX D

MORTUARY DATA AS REPORTED BY FOWKE (1922)

Burial (page)	Age	Sex	Body Manipulation	Associations	Other Remarks
1 (p.67)	"very old"	n.d.	"folded ... on right side ... head east..." disturbed	"a large mortar hollowed on both sides ..."	bones missing "having been dragged away by groundhogs"
2a	"child"	n.d.			
2 (p.69)	"young"	n.d.	"lying on the back ... right arm folded by the side, left forearm across the pelvis ... interred with the flesh" head orientated to west	three sherds of a large pot one foot below the skeleton. "coarse cloth adhereing to the pelvis ..."	Partial skeleton; skull, legs, and feet missing.
3 (p.70)	"baby"	n.d.	n.d.	n.d.	humerus 3.5 inches long
4 (p.70)	n.d.	n.d.	"closely folded ... buried after the flesh had decayed, or had been removed, but while the joints were still united ..."	n.d.	"skull, scapula, right humerus, sacrum, and some of the vertebrae were missing." Extremely fragile. Left tibia 15.5 inches.
5 (p.70)	"very young infant"	n.d.	"on left side, head toward the front of the cave."	"It lay on small angular rocks, with similar rocks over it."	n.d.
5a (p.70)	10 year - old child	n.d.	n.d.	n.d.	single ulna
6 (p.70)	"infant"	n.d.	"lying on the back, head toward the mouth of the cave."	n.d.	femur 4.5 inches long

Burial (page)	Age	Sex	Body Manipulation	Associations	Other Remarks
7 (p.70)	"20 to 25 years"	Female	"closely folded ... It lay on the right side, with the head east.	above child burial (#8)	Bones in "perfect condition" with all teeth "present, solid, and symmetrically set"
8 (p.71)	"8 years"	n.d.	disarticulated	"They lay in a mass of kitchen refuse, shell, burned bones, charcoal, and ashes ..." Between burials 7 and 8 were two large pelvic bones.	The bones' "position, and the small number of them, indicates that the flesh had been used as food."
9 (p.71)	"infant"	n.d.	rodent disturbed	"five shell disk beads ... only instance of ornaments" with bones	most of the remains missing
10 (p.71)	"child less than two years"	n.d.	"lay on left side, head east, legs bent, one arm folded with hand by head, the other along the body" Undisturbed.	n.d.	"Some of the teeth were cut. All the bones were in place, though soft and brittle ..."
11 (p.72)	"child" younger than burial 10	n.d.	n.d.	n.d.	n.d.
12 (p.72)	"adult"	n.d.	"extended on back, head west."	Three rocks, weighing 75 to 300 lbs., were placed over the body.	"Most of the bones had disappeared from decay; the middle third of one tibia was much enlarged by disease ..."
13 (p.72)	"adult"	n.d.	"folded, on right side, head towards rear of cave"	"A slab weighing 100 lbs. or more was set on edge just where the head should have been."	"The bones were spongy and soft. Portions of the feet and legs, most of the pelvis, the left arm, and some of the vertebrae were present." Missing; right arm, skull, and shoulders. Tibia 14.5 inches long.
14 (p.72)	"infant only a few days old"	n.d.	n.d.	n.d.	"no trace of the pelvis or right leg remained, though all the other bones were well preserved."

Burial (page)	Age	Sex	Body Manipulation	Associations	Other Remarks
15 (p.72)	"young child"	n.d.	"extended, on back, head toward rear of cave"	n.d.	"complete skeleton ... evidence of disease"
16 (p.73)	"not fully mature" "the cap fell away from the humerus"*	n.d.	" ... the bones had been thrown on the pile" of charcoal.	small pile of charcoal	present: one scapula, some vertebrae, rib fragments, partial humerus and femur. condition: some were unburned, others charred, and a few burned to a cinder.
17 (p.73)	old "teeth were worn down to the gums"	n.d.	"evidently placed here entire ... it seemed a closely folded body or skeleton ... "	n.d.	decayed and broken

* If this refers to the epiphyseal union at the proximal end of the humerus, the individual was most likely 15 to 19 years old (Bass 1987:18, 144).

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